**GLOBAL ENVIRONMENT FACILITY**
INVESTING IN OUR PLANET

# Livable Cities in India: Demonstrating Sustainable Urban Planning and Development through Integrated Approaches

### Part I: Project Information

**Name of Parent Program**
Sustainable Cities Impact Program

**GEF ID**
10484

**Project Type**
FSP

**Type of Trust Fund**
GET

**CBIT/NGI**
  CBIT **No**
  NGI **No**

**Project Title**
Livable Cities in India: Demonstrating Sustainable Urban Planning and Development through Integrated Approaches

**Countries**
India

**Agency(ies)**
UNEP, ADB

**Other Executing Partner(s)**
Ministry of Housing and Urban Affairs (MoHUA); National Institute of Urban Affairs (NIUA); Greater Chennai Corporation (GCC); Pune Smart City Development Corporation Ltd. (PSCDL); Pune Municipal Corporation (PMC); Surat Municipal Corporation (SMC)

**Executing Partner Type**
Government

**GEF Focal Area**

Multi Focal Area

**Taxonomy**

Focal Areas, Land Degradation, Restoration and Rehabilitation of Degraded Lands, Sustainable Land Management, Climate Change, Climate Change Adaptation, Climate Change Mitigation, Energy Efficiency, Sustainable Urban Systems and Transport, Financing, Influencing models, Demonstrate innovative approache, Transform policy and regulatory environments, Deploy innovative financial instruments, Strengthen institutional capacity and decision-making, Stakeholders, Local Communities, Civil Society, Type of Engagement, Partnership, Participation, Consultation, Information Dissemination, Private Sector, Gender Equality, Gender Mainstreaming, Beneficiaries, Gender-sensitive indicators, Sex-disaggregated indicators, Integrated Programs, Sustainable Cities, Municipal Financing, Energy efficiency, Integrated urban planning, Transport and Mobility, Green space, Urban Resilience, Urban Biodiversity, Capacity, Knowledge and Research, Innovation, Capacity Development, Knowledge Generation

**Rio Markers**
**Climate Change Mitigation**

Climate Change Mitigation 2

**Climate Change Adaptation**

Climate Change Adaptation 2

**Submission Date**

10/7/2021

**Expected Implementation Start**

7/1/2022

**Expected Completion Date**

6/30/2026

**Duration**

48 In Months

**Agency Fee($)**

1,549,409.00

**A. FOCAL/NON-FOCAL AREA ELEMENTS**

| Objectives/Programs | Focal Area Outcomes | Trust Fund | GEF Amount($) | Co-Fin Amount($) |
|---|---|---|---|---|
| IP SC | Transforming cities through integrated urban planning and investments in innovative sustainability solutions | GET | 17,215,652.00 | 499,881,950.00 |
| | | **Total Project Cost($)** | **17,215,652.00** | **499,881,950.00** |

**B. Project description summary**

### Project Objective

To demonstrate low emissions, resilient, nature-based inclusive sustainable urban development in selected cities and support scale-up nationally.

| Project Component | Financing Type | Expected Outcomes | Expected Outputs | Trust Fund | GEF Project Financing ($) | Confirmed Co-Financing($) |
|---|---|---|---|---|---|---|
| Evidence-based sustainable and integrated planning | Technical Assistance | Key stakeholders in target cities adopt evidence-based sustainable and integrated city development planning approaches. | 1.1 Greater Chennai Corporation (GCC) and key stakeholders have access to knowledge, tools, and systems for data collection to undertake integrated spatial plans for managing flood risks and water body restoration through nature-based solutions (NbS).<br><br>1.2 Pune Municipal Corporation (PMC) and Pune Smart City Development Corporation Limited and key stakeholders have access to knowledge, tools, and systems for data collection to undertake integrated spatial planning for compact development and low emission resilient green transit corridors.<br><br>1.3 Surat Municipal Corporation (SMC), Surat Urban Development Authority (SUDA), and key stakeholders have access to knowledge, tools, and systems for data collection to undertake integrated spatial plans for resilient coastal zones and low emission mobility development. | GET | 1,718,360.00 | 3,550,000.00 |

| Project Component | Financing Type | Expected Outcomes | Expected Outputs | Trust Fund | GEF Project Financing ($) | Confirmed Co-Financing($) |
|---|---|---|---|---|---|---|
| 2-1: Investments in low emissions, resilient and nature-based solutions | Technical Assistance | Key stakeholders in target cities apply tools, knowledge and experiences to develop sustainable investment projects for low-emission resilient Urban development. | 2.1 GCC has knowledge and experience to design sustainable investment projects using NbS for low-emission resilient development.<br><br>2.2 PMC has knowledge and experience in developing and implementing sustainable low emission resilient green transit corridor investments.<br><br>2.3 SMC has knowledge and experience of developing and implementing integrated resilient coastal zone development using NbS and low-emission mobility solutions. | GET | 3,099,970.00 | |

| Project Component | Financing Type | Expected Outcomes | Expected Outputs | Trust Fund | GEF Project Financing ($) | Confirmed Co-Financing($) |
|---|---|---|---|---|---|---|
| 2-2: Investments in low emissions, resilient and nature-based solutions | Investment | Key stakeholders in target cities apply tools, knowledge and experiences to develop sustainable investment projects for low-emission resilient Urban development. | Investments made in the pilot projects | GET | 6,793,390.00 | 465,761,950.00 |

| Project Component | Financing Type | Expected Outcomes | Expected Outputs | Trust Fund | GEF Project Financing ($) | Confirmed Co-Financing($) |
|---|---|---|---|---|---|---|
| Innovative financing solutions for cities | Technical Assistance | Target cities increasingly adopt innovative financing solutions and business models to scale up green urban solutions. | 3.1 City authorities in replication cities have tools, experience, and sustainable investment framework based on demonstration work in main target cities (Agra, Puducherry, Madurai)<br><br>3.2 GCC has innovative financing solutions and business models for increasing engagement of private sector in green nature based urban investments.<br><br>3.3 PMC has innovative financing mechanism and business models based on land value capture for financing and engaging private sector in low emission resilient green transit corridors.<br><br>3.4 SMC has (i) innovative financing solutions for managing climatic hazard; and (ii) business models for engaging private sector in development of nature based low emissions NMT infrastructure. | GET | 2,614,000.00 | 9,000,000.00 |

| Project Component | Financing Type | Expected Outcomes | Expected Outputs | Trust Fund | GEF Project Financing ($) | Confirmed Co-Financing($) |
|---|---|---|---|---|---|---|
| Knowledge management and capacity development | Technical Assistance | Increasing number of Indian City authorities and stakeholders use the knowledge, tools, best practice examples, made available on National Urban Learning Platform (NULP), hosted by NIUA, and linked to UrbanShift, to develop and implement integrated sustainable development plans and investments. | 4.1: Knowledge products, good practices and tools are made available to national, state and city authorities as well as other stakeholders through the NULP linked to UrbanShift.<br><br>4.2: Indian City stakeholders? capacity and awareness enhanced to undertake integrated sustainable urban development addressing climate change, biodiversity, and land degradation challenges.<br><br>4.3: Primary target and Replication city authorities and relevant state authorities gain enhanced understanding of integrated sustainable urban development through participation in capacity building and awareness raising activities of the UrbanShift. | GET | 2,010,140.00 | 2,800,000.00 |
| Monitoring and Evaluation | Technical Assistance | | | GET | 160,000.00 | |

| Project Component | Financing Type | Expected Outcomes | Expected Outputs | Trust Fund | GEF Project Financing ($) | Confirmed Co-Financing($) |
|---|---|---|---|---|---|---|
| | | | Sub Total ($) | | 16,395,860.00 | 481,111,950.00 |

**Project Management Cost (PMC)**

| | | | | | | |
|---|---|---|---|---|---|---|
| | GET | | 819,792.00 | | | 18,770,000.00 |
| | **Sub Total($)** | | **819,792.00** | | | **18,770,000.00** |
| | **Total Project Cost($)** | | **17,215,652.00** | | | **499,881,950.00** |

**C. Sources of Co-financing for the Project by name and by type**

| Sources of Co-financing | Name of Co-financier | Type of Co-financing | Investment Mobilized | Amount($) |
|---|---|---|---|---|
| Recipient Country Government | Ministry of Housing and Urban Affairs | Public Investment | Recurrent expenditures | 2,000,000.00 |
| Recipient Country Government | National Institute of Urban Affairs | Public Investment | Recurrent expenditures | 750,000.00 |
| Recipient Country Government | Government of Tamil Nadu (via GCC) | Public Investment | Investment mobilized | 219,500,000.00 |
| Recipient Country Government | Greater Chennai Corporation | Public Investment | Investment mobilized | 2,611,950.00 |
| Recipient Country Government | Pune Municipal Corporation | Public Investment | Investment mobilized | 6,000,000.00 |
| Recipient Country Government | Pune Municipal Corporation | Public Investment | Recurrent expenditures | 2,000,000.00 |
| Recipient Country Government | Surat Municipal Corporation | Public Investment | Investment mobilized | 13,500,000.00 |
| Recipient Country Government | Surat Municipal Corporation | Public Investment | Recurrent expenditures | 2,000,000.00 |
| GEF Agency | Asian Development Bank (ADB) | Loans | Investment mobilized | 251,000,000.00 |
| Recipient Country Government | Ministry of Housing and Urban Affairs | In-kind | Recurrent expenditures | 200,000.00 |
| Recipient Country Government | National Institute of Urban Affairs | In-kind | Recurrent expenditures | 250,000.00 |

| Sources of Co-financing | Name of Co-financier | Type of Co-financing | Investment Mobilized | Amount($) |
|---|---|---|---|---|
| Recipient Country Government | Surat Municipal Corporation | In-kind | Recurrent expenditures | 35,000.00 |
| Recipient Country Government | Pune Municipal Corporation | In-kind | Recurrent expenditures | 35,000.00 |
| | | | **Total Co-Financing($)** | **499,881,950.00** |

**Describe how any "Investment Mobilized" was identified**

Chennai: The loan was identified through ADB?s Country Partnership Strategy and related Country Operations Business Plan (COBP) with the Government of India. The Integrated Urban Flood Management for the Chennai?Kosasthalaiyar Basin Project is co-financed jointly by ADB the Government of Tamil Nadu. Greater Chennai Corporation (GCC) will also co-finance parts of the GEF project based on project preparation consultations. Pune: The investment is identified as part of the Smart Cities Initiative on development of Non-Motorised Transport (NMT) and Electric Vehicle (EV) charging infrastructure in the Transit Oriented Development (TOD) area identified for pilot under the project. Surat: The investment is identified as part of the Smart Cities Initiative on Dumas Sea Front Recreational Development project which will be the baseline for the GEF investment on NbS measures.

**D. Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds**

| Agency | Trust Fund | Country | Focal Area | Programming of Funds | Amount($) | Fee($) |
|---|---|---|---|---|---|---|
| UNEP | GET | India | Climate Change | CC STAR Allocation | 6,449,029 | 580,413 |
| UNEP | GET | India | Biodiversity | BD STAR Allocation | 541,797 | 48,761 |
| UNEP | GET | India | Multi Focal Area | IP SC Set-Aside | 3,338,566 | 300,471 |
| ADB | GET | India | Climate Change | CC STAR Allocation | 4,299,352 | 386,941 |
| ADB | GET | India | Biodiversity | BD STAR Allocation | 361,198 | 32,509 |
| ADB | GET | India | Multi Focal Area | IP SC Set-Aside | 2,225,710 | 200,314 |
| | | | | **Total Grant Resources($)** | **17,215,652.00** | **1,549,409.00** |

**E. Non Grant Instrument**

## NON-GRANT INSTRUMENT at CEO Endorsement

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Includes Non grant instruments? **No**

Includes reflow to GEF? **No**

**F. Project Preparation Grant (PPG)**

PPG Required   **true**

**PPG Amount ($)**

275,230

**PPG Agency Fee ($)**

24,770

| Agency | Trust Fund | Country | Focal Area | Programming of Funds | Amount($) | Fee($) |
|---|---|---|---|---|---|---|
| UNEP | GET | India | Climate Change | CC STAR Allocation | 156,476 | 14,082 |
| UNEP | GET | India | Biodiversity | BD STAR Allocation | 8,662 | 780 |
| ADB | GET | India | Climate Change | CC STAR Allocation | 104,318 | 9,389 |
| ADB | GET | India | Biodiversity | BD STAR Allocation | 5,774 | 519 |
| | | | | **Total Project Costs($)** | **275,230.00** | **24,770.00** |

**Core Indicators**

**Indicator 3 Area of land restored**

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|---|---|---|---|
| 0.00 | 1992.20 | 0.00 | 0.00 |

**Indicator 3.1 Area of degraded agricultural land restored**

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|---|---|---|---|
| | | | |

**Indicator 3.2 Area of Forest and Forest Land restored**

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|---|---|---|---|
| | | | |

**Indicator 3.3 Area of natural grass and shrublands restored**

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|---|---|---|---|
| | | | |

**Indicator 3.4 Area of wetlands (incl. estuaries, mangroves) restored**

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|---|---|---|---|
| | 1,992.20 | | |

**Indicator 6 Greenhouse Gas Emissions Mitigated**

| Total Target Benefit | (At PIF) | (At CEO Endorsement) | (Achieved at MTR) | (Achieved at TE) |
|---|---|---|---|---|
| **Expected metric tons of CO?e (direct)** | 0 | 7392719 | 0 | 0 |
| **Expected metric tons of CO?e (indirect)** | 0 | 28524686 | 0 | 0 |

**Indicator 6.1 Carbon Sequestered or Emissions Avoided in the AFOLU (Agriculture, Forestry and Other Land Use) sector**

| Total Target Benefit | (At PIF) | (At CEO Endorsement) | (Achieved at MTR) | (Achieved at TE) |
|---|---|---|---|---|
| Expected metric tons of CO?e (direct) | | 434 | | |
| Expected metric tons of CO?e (indirect) | | 26,686 | | |
| Anticipated start year of accounting | | 2022 | | |
| Duration of accounting | | 15 | | |

**Indicator 6.2 Emissions Avoided Outside AFOLU (Agriculture, Forestry and Other Land Use) Sector**

| Total Target Benefit | (At PIF) | (At CEO Endorsement) | (Achieved at MTR) | (Achieved at TE) |
|---|---|---|---|---|
| Expected metric tons of CO?e (direct) | | 7,392,285 | | |
| Expected metric tons of CO?e (indirect) | | 28,498,000 | | |
| Anticipated start year of accounting | | 2022 | | |
| Duration of accounting | | 20 | | |

**Indicator 6.3 Energy Saved (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)**

| Total Target Benefit | Energy (MJ) (At PIF) | Energy (MJ) (At CEO Endorsement) | Energy (MJ) (Achieved at MTR) | Energy (MJ) (Achieved at TE) |
|---|---|---|---|---|
| Target Energy Saved (MJ) | | | | |

**Indicator 6.4 Increase in Installed Renewable Energy Capacity per Technology (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)**

| Technology | Capacity (MW) (Expected at PIF) | Capacity (MW) (Expected at CEO Endorsement) | Capacity (MW) (Achieved at MTR) | Capacity (MW) (Achieved at TE) |
|---|---|---|---|---|

**Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment**

| | Number (Expected at PIF) | Number (Expected at CEO Endorsement) | Number (Achieved at MTR) | Number (Achieved at TE) |
|---|---|---|---|---|
| Female | | 5,813,016 | | |
| Male | | 6,395,381 | | |
| Total | 0 | 12208397 | 0 | 0 |

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

**Part II. Project Justification**

**1a. Project Description**

| Original Outcome and Output Statements | Revised outcome and output statements | Explanations |
|---|---|---|
|  |  |  |

Outcome 1: The Urban local bodies in four selected Urban agglomerations initiate development based on evidence-based sustainable and integrated city development plans

1.    Technical support and tools provided to enhance mechanisms for inter-agency and stakeholder coordination

2.    Comprehensive, integrated spatially-diverse and digitized maps prepared / improved for natural and human-made assets, and submitted to the authorities for approval

3.    Tools and training provided to integrate natural ecosystems, climate risk exposure, spatial dimensions, city services and other livable city indicators 6in developing master urban development plans

Outcome 1: Key stakeholders in target Cities adopt evidence-based sustainable and integrated city development planning approaches.

1.1 Greater Chennai Corporation (GCC) and key stakeholders have access to knowledge, tools, and systems for data collection to undertake integrated spatial plans for managing flood risks and water body restoration through nature-based solutions (NBS).

1.2 Pune Municipal Corporation (PMC) and Pune Smart City Development Corporation Limited and key stakeholders have access to knowledge, tools, and systems for data collection to undertake integrated spatial planning for compact development and low emission resilient green transit corridors.

1.3 Surat Municipal Corporation (SMC), Surat Urban Development Authority (SUDA), and key stakeholders have access to knowledge, tools, and systems for data collection to undertake integrated spatial plans for resilient coastal zones and low emission mobility development.

Guwahati was included during the PIF stage as there was significant ADB financing for urban and water infrastructure development in Assam State.  However, during project preparation, the ADB loan was discontinued at the request of the Government of India. Without the baseline investment ADB would not be able to participate in Guwahati under the GEF. It was decided instead, to work in three core cities, where more focused work could be carried out, but also add three ?replication? or secondary cities.  This was discussed with and concurred by MoHUA.

The outcome language was adjusted based on the GP outcome and also make it more specific.

The outputs are changed to capture the outputs in each of the target cities. Each of the city outputs capture the three proposed outputs related to ? coordination among agencies, supporting integrated plans, and strengthening the digitization of data for supporting planning. Thus, the three outputs in the child project  are now the deliverables for each of the target cities.

| | | |
|---|---|---|
| Outcome 2 - City capacities enhanced to develop and leverage finance for low-carbon and nature-based solutions<br><br>1. Technical support and access to funding facilitated for Investments in sustainable, nature-based solutions for infrastructure initiated:<br><br>a. Integrated, low emissions, resource efficient, resilient as well as nature-based infrastructure in identified mixed use areas (e.g., last mile connectivity, zero carbon, efficient and resilient buildings, city services etc)<br><br>b. Smart resource efficiency and circular economy for industrial development zones<br><br>c. Rehabilitation / restoration / protection of biodiversity and ecosystems services in selected natural water bodies | Outcome 2: Key stakeholders in target cities apply tools, knowledge, and experiences to develop sustainable investment projects for low-emission resilient urban development.<br><br>2.1 GCC has knowledge and experience to design sustainable investment projects using NbS for low-emission resilient development.<br><br>2.2 PMC has knowledge and experience in developing and implementing sustainable low emission resilient green transit corridor investments.<br><br>2.3 SMC has knowledge and experience of developing and implementing integrated resilient coastal zone development using NbS and low-emission mobility solutions. | The language of the outcome is refined to reflect the outcome that will be achieved through the outputs and make it more effective.<br><br>The outputs are aligned for each target city and the demonstration of solutions that reflect the key integrated planning and sustainable investment challenges each of the target city faces.<br><br>The priority in Surat was shifted from industrial development zone to focus on integrated coastal zone development which has now been included in the SMC areas. This was considered a priority specially as this is an area that is likely to develop rapidly in coming years and the zone is vulnerable to climate change related impacts. In Pune the focus is on mixed use development through the support to implementation of TOD policy along the MRTS and BRTS corridors. |

| | | |
|---|---|---|
| Outcome 3: Cities use innovative financing solutions and business models to scale up green urban solutions<br><br>1. Technical support provided for Smart, sustainable, nature-based urban infrastructure and other investment opportunities identified for replication and scaling up (e.g. Agra, Dibrugarh, Coimbatore, Imphal)<br><br>2. Technical support provided for developing Innovative financial instruments for city government sustainable, nature-based infrastructure and services (e.g. public private partnerships, land value capture, green bonds, etc.)<br><br>3. Technical support provided for identifying diversified sources of financing for urban local bodies (ULBs) to develop sustainable, nature-based infrastructure financing | Outcome 3: Target Cities increasingly adopt innovative financing solutions and business models to scale up green urban solutions.<br><br>3.1 City authorities in replication cities have tools, experience, sustainable investment framework based on demonstration work in main target cities (Agra, Puducherry, Madurai)<br><br>3.2 GCC has innovative financing solutions and business models for increasing engagement of private sector in green nature based urban investments.<br><br>3.3 PMC has innovative financing mechanism and business models based on land value capture for financing and engaging private sector in low emission resilient green transit corridors.<br><br>3.4 SMC has (i) innovative financing solutions for managing climatic hazard; and (ii) business models for engaging private sector in development of nature based low emissions NMT infrastructure. | Three cities were picked for replication, Agra, Madurai and Puducherry ? with activity sets and budget allocations dedicated to each - to enable their participation in the global program. The initial list was indicative.<br><br>The outputs are organized as per the three target cities covering the aspects mentioned in output 2 and 3 in the child project. So substantively there is no change in the component except the presentation. |

| | | |
|---|---|---|
| Outcome 4: City practitioners and stake-holders across India adapt/localize knowledge and experience provided through national sustainable cities platform<br><br>1.    Capacity development through trainings and peer to peer learning provided to ULBs<br>2.    Key partnerships and networks for sustainable cities created and linked to Global Platform for Sustainable Cities (GPSC)<br>3.    Technical support provided to enable audience-segmented behavior change programs and campaigns in collaboration with GPSC and four core city governments | Outcome 4: Increasing number of Indian City authorities and stakeholders use the knowledge, tools, best practice examples, made available on National Urban Learning Platform (NULP), hosted by NIUA, and linked to UrbanShift, to develop and implement integrated sustainable development plans and investments.<br><br>4.1 Knowledge products, good practices and tools are made available to national, state and city authorities as well as other stakeholders through the NULP linked to UrbanShift.<br><br>4.2 Indian City stakeholders? capacity and awareness enhanced to undertake integrated sustainable urban development addressing climate change, biodiversity, and land degradation challenges.<br><br>4.3 Primary Target and Replication City authorities and relevant state authorities gain enhanced understanding of integrated sustainable urban development through participation in capacity building and awareness raising activities of the UrbanShift. | The outcome language was refined to add specificity.<br><br>The outputs are re-arranged covering the elements mentioned in the child project. The child project output 1 is covered under 4.2 which covers capacity building based on component 1 ? 3 outputs among other ULBs.<br><br>The child project output 2 is covered under output 4.1 which creates the platform for sharing the project knowledge through NIUA platform, which will link to the UrbanShift website.<br><br>The child project output 3 is covered under Output 4.1 and 4.2. |
| GHG Emissions reductions | Direct - 5,427,225MtCO$_2$e<br><br>Indirect - 24,252,154 MtCO$_2$e | Direct ? 7,392,719 MtCO$_2$e<br><br>Indirect 28,524,686 MtCO$_2$e |

| Land Restored | 700 hectares | 1020.6 hectares<br><br>48.6 hectares is the area of Lake rejuvenated using GEF funds. Rejuvenation of another 20 lakes based on the pilot will be initiated by the GCC. This covers a total area of 972 hectares. |
|---|---|---|
| Co-finance | USD 303,250,000 | USD 499,881,950<br><br>At the PPG stage additional co-finance identified from the target cities Chennai, Pune and Surat. Also, additional co-finance was identified from MoHUA and NIUA. |

|  |  |  |
|---|---|---|
|  |  |  |

# 1a) Project Description

# a) The global environmental problems, root causes and barriers that need to be addressed (systems description)

# A. Introduction

In India, urban population reached 420 million or 33% of its total population in 2015. While the share of urban population, at 33%, is less than the world average of 50%, the urban population of India is larger than any other country in the world except China.  Most of the growth is in cities with population between 1 and 5 million (including cities like Surat and Pune) that grew about 85% between 2001 and 2011 (See figure 1). Most of the urban growth in India is in the peri-urban areas adjacent to the municipal boundaries. Net rural-urban classification of areas and natural growth of population in these areas are the driving factors for urban growth between 2001-2011. This is reflected in the large increase in number of new census towns between 2001-2011 which researchers termed as ?census activism? (Guin and Das, 2015 in Haque and Patel, 2018)[1].

[1] Haque, I., and P. P. Patel, ?Growth of metro cities in India: trends, patterns and determinants?, Urban Research & Practice

Volume 11, 2018 - Issue 4.

As per the Technical Group on population projections (July 2020)[1], established by National Population Commission, the urban population is expected to be 594 million (39% of total population) by 2036.
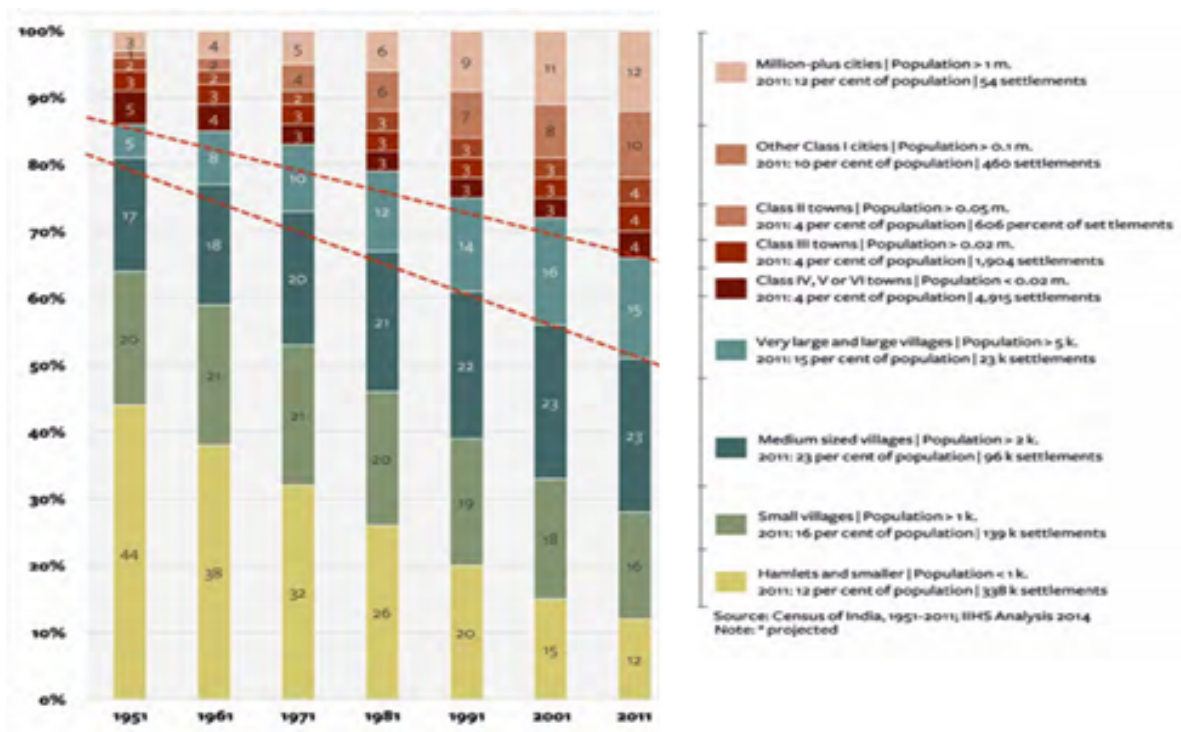


Figure 1: DISTRIBUTION OF POPULATION BY SETTLEMENT SIZE CLASSES (1951- 2011)

Increasing economic opportunities in urban centers is the key driver of growth in urban population resulting from rural urban migration. A distinct feature of urban growth in India is the urban sprawl. Low density growth in the city core has resulted in expansion of city boundaries to meet the increasing land demand for economic activities, residential, and associated infrastructure demand to service the cities. The city core area, during 1991-2001 period, grew at an annual growth rate of 4.85%, while the peripheral area grew at a rate of 29.32% per annum. The influence of city expansion has also resulted in change in land use in peri-urban areas. Delhi?s urban area has nearly doubled between 1990 ? 2010. Mumbai Metropolitan region?s built-up area has increased by 4.5 times between 1972 and 2011 though the population grew only by 3 times.[2] Similarly, Pune core area witnessed 2.07% annual population growth rate, whereas the peripheral area witnessed annual population growth rate of 4.64%; Chennai core area witnessed annual growth rate of 0.67%, whereas peripheral area experienced a growth rate of

6.55%; and, Surat core city area, on the other hand, witnessed a higher growth rate 6.07% between 2001-2011, whereas the peripheral area registered a decline of 11.18% per annum during the same period.

This peri-urbanization and the new developments with low density in Indian cities has led to land degradation, loss of biodiversity, resource depletion and high levels of GHG emissions. Urban pollution has caused 120,000 premature deaths in six Indian cities with an economic cost of $8.1 billion in 2020[1]. Largely ineffective and broad-brush planning and regulations are leading to destruction of lakes, encroachments of lake beds, closure of natural drainage channels that further lead to flooding during the monsoons (IIHS, 2015)[2]. With the rapid growth of peri-urban areas in Indian cities and the lack of capacity to provide basic services to these areas by rural local bodies, peri-urban neighborhoods depend on groundwater for drinking purposes and poorly designed soak pits and septic tanks for sanitation facilities. These poorly designed sanitation facilities interfere with the water bodies and aquifers which leads to water pollution.

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[1] https://www.greenpeace.org/india/en/press/10991/1800-deaths-per-million-estimated-due-to-pm2-5-air-pollution-in-delhi-reveals-a-new-finding-by-greenpeace-and-iqair/

[2] Untitled-1 (iihs.co.in)

GHG Emissions: The impact of urbanization on GHG emissions in India has been significant. Cities account for only 2.35% of India?s land area but they account for about 80% of the country?s electricity consumption, and account for 45% of the total GHG emissions, which come from buildings, cooking fuel, urban waste, transport, and industry (Tiwari et al, 2015). A study by the City Carbon Footprint Initiative identified 25 cities in India among the top 500 GHG emitting cities of the world. Further information on the same can be found at https://www.downtoearth.org.in/dte-infographics/61005_emission_cities_india.html.

Table 1 presents assessment of GHG emissions in Indian cities by key sectors. Transport sector has the largest share followed by Domestic sector, Industry, and Electricity Consumption (electricity consumption in commercial and public sector, domestic and industry sector is included in the emissions of those sectors). The key drivers of the emissions in domestic and electricity consumption sector are the growing demand, in-efficient use of electricity by appliances and for cooling, and low energy efficient building designs. High share of fossil fuel in electricity generation and other uses pf energy in domestic, industry and transport sector too contribute to high GHG emissions. The key drivers of transport emissions are growing demand for travel due to increasing population, urban sprawl, growth in the use of private vehicles due to lack of public transport infrastructure, and increased incomes. Growing need for cooling, which too is affected by unsustainable development of city and increasing incomes has contribution to the growth in GHG emissions. Increased loss of green spaces which is extended over larger area due to urban sprawl has resulted in heat island effect resulting in increased demand for cooling. This coupled with increase in temperatures due to climate change will further increase the demand of cooling.

Table 1: GHG emisisons (?000 tonnes) by sectors in selected indian cities[3]

| | Electricity Consumption | Transport Sector | Domestic Sector | Industry Sector | Waste Sector | Total Emissions |
|---|---|---|---|---|---|---|
| Delhi | 5428.55 | 11690.43 | 10867.51 | 3049.3 | 2231.94 | 33267.73 |
| Greater Mumbai | 4049.85 | 8474.32 | 3320.66 | 1789.69 | 1928.01 | 19562.53 |
| Kolkata | 1746.34 | 6337.11 | 1886.6 | 2615.84 | 1064.2 | 13650.09 |
| Chennai | 2859.07 | 8617.29 | 4180.28 | 4472.35 | 822.51 | 20951.5 |
| Greater Bangalore | 2456.8 | 4273.81 | 8608 | 2437.03 | 1134.02 | 18909.66 |
| Hyderabad | 870.4 | 2341.81 | 7788.02 | 1563.14 | 920.41 | 13483.78 |
| Ahmedabad | 888.73 | 2544.03 | 2273.72 | 2044.35 | 654.23 | 8405.06 |
| Total | 18299.74 | 44278.8 | 38924.79 | 17971.7 | 8755.32 | 128230.4 |
| Share | 14.27 | 34.53 | 30.36 | 14.02 | 6.83 | 100.00 |

Chennai?s GHG inventory reveals that energy consumption in buildings is a major source of greenhouse gas emissions, together with emissions from on-road transportation and the waste sector. Overall, indirect emissions associated with the consumption of grid-supplied electricity is responsible for 43% of total emissions in Chennai, mostly attributable to residential buildings and the construction and manufacturing industries. This reflects the high carbon-intensity of the electricity grid.

As per the draft report on Carbon Inventory of Pune City,[1] It was estimated about 4.66 million tCO2e emissions in the year 2010-2011 and emissions per capita of 1.46 tCO2e. As shown in Figure 2 the residential sector is the largest contributor to GHG Emissions followed by industrial electricity consumption, and transport sector.
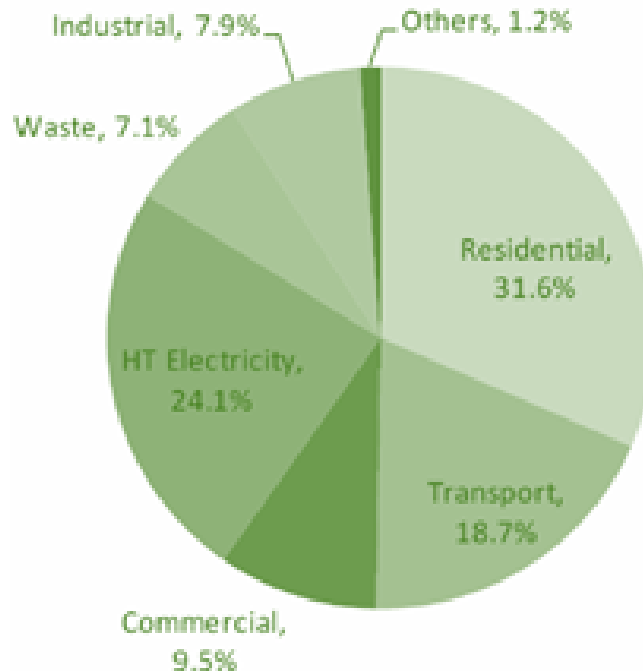
Figure 2: Sectoral distribution of GHG emissions, pune

[1]
https://www.pmc.gov.in/sites/default/files/miscellaneous/Carbon_Inventory_of_Pune_City_2012.pdf

Climate Risk of Cities: According to the Climate Risk Index (German Watch Climate Resilience Index, 2018) India is the fifth most climate vulnerable country in the world.  The annual average temperatures in India are projected to increase 1?C to 2?C under the climate-sensitive scenario and 1.5?C to 3?C under the carbon-intensive scenario (World Bank, 2018[4]). The cities will be impacted from climatic changes through increased flooding and droughts, aggravating the existing heat island effects thus resulting in heat waves and also influencing the energy use and GHG emissions from the cities.

Climate change is likely to force the pace of rural-urban migration over the next few decades. The per capita availability of land will reach 0.2 hectares by 2035 from 0.37 hectare in 1991, resulting in smaller land holdings and thereby reducing farm productivity. The ongoing crisis in rural areas of India could be further exacerbated by climate change factors such as extreme events, monsoon variability, droughts and floods which will force rural population to migrate to cities (Revi, 2008). The severe scarcities and vulnerabilities in cities due to water scarcity, flooding, and lack of environmental services, alternatively, could become a threat to social and economic mobility of backward castes and women.

Climate change makes cities vulnerable and imposes huge risks with increased water stress, heat island effect, increased frequency, and severity of extreme weather events such as urban floods/ droughts. The Further, air quality deterioration poses serious challenges for city administrators as a total of 102 cities in India, of which 43 are Smart Cities, are already facing poor air quality[10].

[10] https://www.niua.org/csc/assessment-overview.html

Floods and Drought: Most of the Indian cities face the challenge of frequent flooding during the rainy season and depleting water resources. Major causes of urban flooding include urbanization, heavy rainfall over the cities and/or upstream catchments, overflows from upstream dams/rivers, and construction on the flood plains or low-lying areas in the cities. Urban heat islands are also a cause of convective rainfall increase in and around cities, thus inducing flooding. Rapid urbanization has resulted in increased paved areas, decreased water bodies, reduced groundwater recharge, and reduced capacity of urban drainage channels. A study by WRI[5] indicated that in India?s 10 most populous cities (Chennai, Pune, Surat, Ahmedabad, Bengaluru, Delhi, Hyderabad, Jaipur, Kolkata, and Mumbai), 35% (428 sq.km) of new urban development added between 2000-15 (within 20 km of the city centre) has been on (low-lying, vegetated) high and very high recharge potential zones. All these cities have seen multiple flood events in the past five years. This is compounded by the climatic changes that have resulted in more intense rainfall events. The factors that affect floods also lead to water shortage as low recharge causes depleting ground water resources. A key factor is the non-consideration and integration of natural ecosystems and drainage pattern in the urban planning process as well as dependence on grey storm water drainage infrastructure.

Heat Island Effect: The increasing grey infrastructure and loss of green spaces (see below) in the cities is leading to heat island effect. A study of 44 Indian cities with a population of more than one million has shown an increase in temperature and slower cooling down during evening and nights. This has resulted in decrease in temperature difference between daytime and night-time temperatures in the city. This impacts the cooling requirements within the city and also has an impact of local pollution. This is also likely to cause heat waves that would be further aggravated due to increase in temperatures because of climate change.
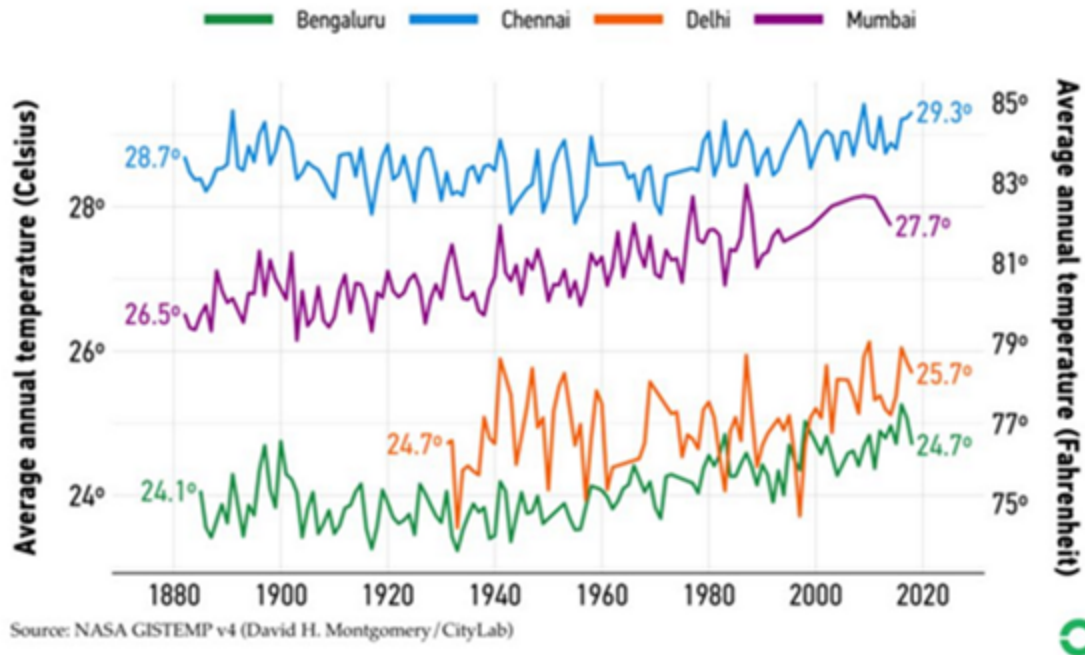
Figure 3: AVERAGE ANNUAL TEMPERATURES FOR MAJOR INDIAN CITIES[6]

Land Degradation and Biodiversity loss:  Accelerated urban growth in Indian cities have impacted the natural environment in the cities and also its peripheral areas. The increase demand of built-up infrastructure has resulted in the increased conversion of urban green spaces to grey infrastructure. The fragmentation of green spaces and encroachment of natural drainage channels to create built-up infrastructure in an unplanned manner has contributed to drying of water bodies, wetlands and coastal ecosystem within city and peripheral areas. This has been further aggravated by the increasing pollution of water as a significant share of untreated and partially treated wastewater gets discharged in rivers, lakes and reservoirs and also results in degradation of these ecosystems. Solid waste too in the cities gets disposed of in river bodies resulting in pollution and degradation.

The approach to accommodate increased need for space due to growing economic activity and population has been through expanding the city boundaries, as a result cities have grown horizontally then vertically. This has pushed construction in peri-urban areas to meet demand for housing and infrastructure from low-income groups as the land is often cheaper. The development in these areas has a greater impact on natural ecosystems due weak regulations in the peri-urban areas. The urban /peri-urban growth in Indian cities has come at the cost of other land-use categories such as agricultural land, forest, wetlands etc. with resulting effects on biodiversity and ecosystem services (Table 2 below). The built-up area in Delhi in since 1980 has increased by 30.6 %, while cultivated areas decreased by 22.8 % and dense forest by 5.3 %. In Kolkata, vegetated areas decreased from 33.6 percent % of the city to 7.4 percent % between 1980 and 2010.

Table 2: Land use change in some key cities of india from 1990 ? 2010. [7]

| Land Use | Chennai | Ahmedabad | Patna | Guwahati | Chandigarh |
|----------|---------|-----------|-------|----------|------------|
|          |         |           |       |          |            |

| | | | | | |
|---|---|---|---|---|---|
| Built up | 41% | 173% | 97% | 40% | 14.5% |
| Water bodies | -13% | +167% | -51% | | 0.37% |
| Fallow Land | -0.5% | -50% | -77% | | +25.84% |
| Forest/vegetation | -15% | -32% | -64% | -10% | 0.03% |
| Agriculture | -3% | -86% | -40% | -10% | -24.5% |

The adoption and continuation of sprawled, automobile-dependent cities could increase economic, social, and environmental costs of USD 1 trillion per annum by 2050 on India ? representing 3% of GDP in 2050 (Tiwari et al, 2016)[14].

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[14]https://newclimateeconomy.report/workingpapers/wp-content/uploads/sites/5/2016/11/NCE2016_India.pdf

Air Pollution: Another associated issue of unsustainable urban growth is air pollution. The most commonly identified sources of air pollution are vehicles, manufacturing, construction activities, road dust, waste burning, combustion of oil, coal, and biomass in the households, and marine/sea salt. This is reflected in the multi-city study conducted by CPCB[8] for six cities, summary of the study is presented in Figure 4 below. Urban sprawl, often resulting in inadequate public transportation infrastructure, is arguably one of the largest drivers of poor air quality. iQAir?s 2020 World Air Quality Report identified 22 Indian cities in the top 30 most polluted cities in the world. Though there have been improvements since 2018, the levels are still well above the WHO standards. 1.7 million deaths in India were attributable to air pollution in 2019, which was 18% of the total deaths in the country according to India State-Level Disease Burden Initiative.
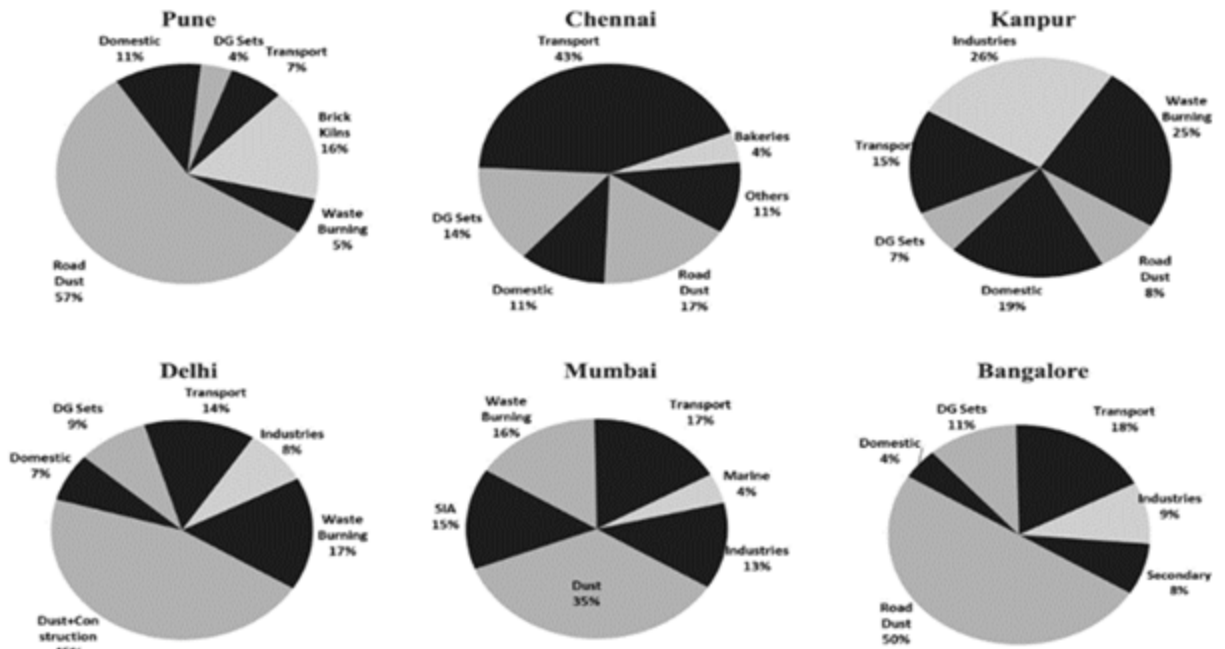
Figure 4: AVERAGE PERCENT CONTRIBUTIONS OF MAJOR SOURCES TO PM10
POLLUTION[9][1]

Given these huge negative externalities described above, business as usual urban development in India, with the urban population expected to double to 595 million by 2036, is clearly not sustainable.

Given that cities are at the forefront of India's transformation towards the $5 trillion economy goal set by the Government of India (GoI), addressing the climate change risks in Indian cities is key for charting a sustainable path for the country. The GEF project aims to help Indian cities to reduce GHG emissions, protect and conserve ecologically sensitive areas, reduce air pollution and congestion, and help reduce inequities in urban service delivery for vulnerable communities. The project will increase city authorities? and state authorities?, with mandate in urban development, capacity to undertake integrated urban planning through low-carbon, nature-based solutions, and increase sustainable long-term investments into urban service delivery.

# B. Root causes of the problem and barriers to change

•The five top root causes, with associated barriers, currently impeding Indian cities from transforming to sustainable urban development are listed below.

*Root Cause 1: Master plan for urban development is driven by expansion needs and does not consider of holistic view of city needs and the environmental impacts.*

The key planning document for cities is the Master Plan for metropolitan area. It is a statutory requirement and has a horizon of 20 years. Master plan is essentially a land use control plan. The Plan development is based on secondary data collected from various agencies, surveys, and stakeholder consultations. The Plan is based on projected population of an urban area, estimates of average household size, income levels, distribution of households and economic development of the city, and determines the land needed for residential, industrial, commercial, public, and semi-public etc. It proposes a network of roads and pattern of streets to meet the mobility needs of projected population as well as allocates land for it. It also identifies areas of cultural, historical, natural, and environmental value, etc. to be protected. In addition, development control regulations specify the plot coverage, height, and size of the building (these factors govern the density of the city). On the transport side, it allocates land for future road networks and does not address mobility and urban transport issues. The plan proposals mostly try to resolve the supply side of urban development to meet the land demand.

Master plan focuses on development of new areas brought within the urban boundaries without revisiting the opportunity of meeting demand in existing developed areas through re-development or densification. Thus, the opportunity to reduce the demand of additional land and conversion of more green areas into built up areas is not captured in the Master plan.

Master plan defines the key corridors for transportation to connect various areas based on the land use and activity distribution defined by land use zoning. It doesn?t consider the impact of transport supply on the land use and activity distribution within urban area. The lack of integration of interaction of transport infrastructure and land use results in lost opportunity to reduce trip lengths, increased use of public transport and NMT transport use, reduce GHG emissions and air pollution, etc. This could also help reduce the impact on green spaces and sensitive ecosystems by facilitating reducing growth of transportation in such areas and increasing availability of transport in other areas to make them more attractive for development.

Master plan doesn?t consider environmental aspects in land use zoning, such as integrating water management in land use planning. Master plan doesn?t consider flood prone areas in land use zoning and value of natural drainage and wetlands/water bodies in reducing flood risks. The planning of land use also doesn?t consider the need for land to green the drainage areas, water bodies, and flood plans of rivers as an important land use to protect these areas and increase their capacity to regulate water.

*Root Cause 2: Siloed development of plans for detailing Master plan and developing infrastructure in the cities.*

The Master Plan is detailed out through local area (e.g., Town Planning Scheme (TPS))/zonal plans for the land use defined in the Master Plan. Multiple government entities, city level and state level, are responsible for undertaking development of these plans and developing investment projects. The local area development plans define the infrastructure development in the plan areas such as, the residential buildings, markets space, social infrastructure, green spaces, streets, etc. The city is segregated into a number of smaller parcels of lands and the planning is carried out for each of these parcels of land.

Each of these plans are developed independently and thus do not address the larger concerns of urban sustainability such as compact urban form, protection of ecological landscape within the cities, etc. (Sanyal and Deuskar, 2012).[1]

The state government entities are responsible for developing the urban infrastructure such as transport, industrial area development, electricity supply, water supply and waste management etc. The development of transport infrastructure itself involves multiple government entities, viz, state transport department, railways which develops and manages the sub-urban rail network, special corporations created for development metro rail infrastructure, and so on. City government entities are responsible for development and management of green spaces within the city jurisdiction. This is further complicated by the sectoral plans developed at city level to enable financing for investment through various funding schemes that are implemented by the Central government. For example, the comprehensive mobility plans, which became a requirement through Jawaharlal Nehru Urban Renewal Mission (JNURM), for receiving funds for transport related infrastructure and services were developed based on the Urban Development plan rather than as an integral part of the plan to reduce travel distances and congestion. Similarly other plans required by multitude schemes launched by the central and state governments (such as, City Development Plan (CDP) under JNURM, Slum free city plans under the Rajiv Awas Yojana of Central Government, Solid Waste Management (SWM) Plan, Smart City plans, Clean Air Plan, Atal Mission for Rejuvenation and Urban Transformation (AMRUT) Plan etc.) are prepared separately.

These multiple plans for development of built-up area and urban infrastructure are all developed in siloes by the respective government entities. The potential for synergies to enhance the socio-economic and environmental benefits may not be captured as a result. For example, the mobility infrastructure in a local area plan may not consider the public transport infrastructure transacting through the plan area. The opportunity to develop local area street network, parking and NMT infrastructure to synergize with the public transport nodes may not be captured. In case of local area plans for coastal areas the process the planning for coastal zone protection and management of coastal ecosystem is done separately. The influence of local area plans on coastal zone ecosystems and measures to protect coastal zone ecosystems on local area plan are not considered by either of the plans. Thus, the siloed planning process fail to capture opportunities for enhancing the benefits of plans and may in fact result in decrease the benefits by working at cross purposes.

*Root cause 3 ? Insufficient finance available to implement sustainable urban investments at scale*

A third root cause affecting sustainable urban development is insufficient finance and lack of investment in sustainable infrastructure projects and solutions. Though, the 74th Constitutional Amendment Act (74th CAA), 1992 mandated the cities with a number of functions and to receive funding from the central government to undertake them but without providing for commensurate finances or mandate to raise taxes to meet the responsibilities. The municipal revenues and spending in India constitute less than 1% of the country?s GDP, whereas more than 40% of GDP is generated from cities. Further, a number of public finance instruments viz., taxation, user charges, transfers and market debt are not leveraged even where there is a mandate to deploy them. The general principles of benefit taxation (beneficiary pays), user charge levy (users pay) and internalization of externalities (congestion charges and polluter payments) are not paid in the process of fiscal management of Indian cities.

The other challenge is non-consideration of sustainability aspects in investment decisions which leads to investment in high energy and a high-carbon development trajectory. Though many city leaders understand the benefits of pursuing more sustainable and resource-efficient investments, too often decisions reflect the perception that such investments are high cost and payback is long term and goes against the short-term interests. This is also compounded by procurement rules not being designed to consider sustainability aspects. For example, most public procurement are based on the minimum construction cost thus not incorporating the cost of maintaining the infrastructure and costs of negative environmental impacts.

The additional infrastructure spending is not very high as it is perceived. According to a UNEP study, achieving a low-carbon scenario would require adding only 5 % to existing infrastructure spending (UNEP, 2018). It is possible to cut 90% of cities' emissions using proven technologies and practices while also generating an attractive economic return.

*Root cause 4 ? Limited local examples and practical, hands-on experience with integrated, innovative, and sustainable solutions that demonstrate multiple local and global benefits*

There has been practically no or very limited experience in integrated sustainability solutions implementation in India cities. The environmental challenges such as solid waste management, wastewater management, green spaces, air pollution, etc. has been recognized, but the solutions are focused on either end of pipe solution or developed in isolation from the broader context. For example, the national air pollution action plan is focused on reducing emissions from sources through technology uses, such electric vehicles, but doesn?t consider into account the implement of development pattern on the transport need that adds to the air pollution. The consideration of climate change is a very recent phenomena and is limited to assessment and options for reducing GHG emission from urban activities. Consideration of resilience is even more limited.

*Root cause 5 ? Inadequate mechanisms to facilitate dissemination and replication of experiences, innovative practice and lessons learned on integrated sustainable urban planning*

The fifth and final root cause is that practitioners and other stakeholders in Indian cities lack mechanisms and resources to access experiences, good practices and lessons learned on integrated urban planning undertaken nationally and internationally. Nationally, there is not a central source of trusted and evidence-based information on integrated urban sustainable solutions that consider GHG reduction, biodiversity conservation and sustainable land management. This is now being addressed by NIUA through NULP. As a consequence, local governments undertake sectoral planning and implement solutions that they are aware of, based on past local experiences.

**<u>Key Barriers that prevent from addressing the above root causes are:</u>**

<u>Lack of Multi-level and cross-sectoral government coordination</u>: The constitutional division of responsibilities between the three levels of government (national, provincial, and municipal) is a factor in the weak coordination in the planning and implementation of urban development. There is a multiplicity of central and state government entities providing services in urban and rural areas, urban local bodies, rural bodies, and district level bodies that govern within a metropolitan region. This

results in ?duplication of functions? and ?overlapping jurisdictions. The 74th Constitutional Amendment Act (74th CAA) of 1992 calls for devolution of 18 functions to the Urban Local Bodies (ULBs). However, State governments have only complied partially. The setting up of state level entities (parastatals) and other agencies for various responsibilities within the urban boundaries have undermined the functional domain of the ULBs.

While sectoral agencies are established with a metropolitan mandate in Indian metros, none of them are mandated to perform the required tasks of inter-departmental coordination and trans-municipal cooperation for regional growth with sustainability imperatives.

For large metropolitan cities, the 74th CAA calls for the establishment of a Metropolitan Planning Committee (MPC) which has not been effectively operationalized. This has created a vacuum in the institutional structure for urban services in cities. As per the 74th CAA, MPC is required to consolidate the draft development plan for the metropolitan area. The development plan prepared by MPC covers all matters of common interest to municipalities and panchayats and facilitates integrated development of infrastructure and environmental conservation and resource sharing.

Limited capacity, enabling tools and lack of data governance: Traditionally, planners work on land use plans exclusively, switching to an integrated approach requires training and a new way of collaborating with colleagues working in different departments. This is compounded by limited understanding of planners and decision-makers of the inter-connectivity and interdependence of urban challenges and the need to apply an integrated planning approach. Although town-planners are often familiar with the theoretical conceptualization of cities as complex systems, they lack the ability to put this concept to work in their daily analysis and practice.

This is compounded by, both, consideration of environmental (air pollution, GHG emissions, land degradation, flooding, etc.) objectives for planning and lack of information regarding possible approaches for integrating and using this information in ways that will promote more sustainable development. The planning methodology used is still based on individual sector planning and on land allocation. There is a lack of any methodology or tools that would enable planners to consider the impact of city planning on its various challenges.

Lack of effective data collection and governance for planning and management: The data governance framework for integrated planning is at a nascent stage in Indian cities. Data is normally collected as part of the planning process to assess the demand for land and various services. There is no systematic and regular collection of data which could be used both for planning as well as for monitoring the implementation. Smart Cities mission has initiated in the city to develop a digitized map using the geographic information system (GIS) of the city and various resources and develop an integrated command and control centre (ICCC). This is at a nascent stage and currently most of the information is related to traffic monitoring and management of revenue collection and some of the services such as waste collection. Most of these systems lack digitized layers of various natural resources in the city (water bodies, rivers systems, drainage channels, etc.) or human developed infrastructure. There are limited resources, information, and data, including on transport, waste, etc.

Some of the larger Indian cities may collect data, this data is siloed and often not shared amongst institutions, partially due to lack of data infrastructure that could facilitate easy access. This data is collected largely for daily management needs and by sectoral priorities, and in many cases different municipal services develop stand-alone information systems to cover their own needs. Thus, data is collected in various formats leading to technical incompatibility between silos which prevents its effective sharing and analyzing. As a result, despite the availability of whatever limited data is collected with different agencies, not much has been used to draw insights to create data-based actions for sustainable development policies, planning and regulations.

Lack of linkages between Urban Development plans, and financing & operations strategy: Orderly growth of cities calls for adequate finances and adoption of investment strategies in accordance with the master plan for effective implementation. However, raising resources for implementation of the plan is generally not an integral part of a development plan. As a result, implementation of development plans has not been more than 30% in many of the Indian cities (Meshram, 2006).[2] At present, Urban Development plans are being used only as a basis for regulating development, rather than guiding sustainable urban growth.

Urban development plans are also not supported by systematic financial and operating strategies that focus on using city?s assets to mobilize resources. The underdeveloped land monetization in Indian cities is also a result of the lack of financing framework within planning processes. Formulation of a framework that links urban planning with capital investment is needed to unlock urban growth potential and focus energies of the authorities on strategic projects that lead to urban transformation in a sustainable manner.

Lack of local investment options for financing the implementation of integrated urban plans and actions: The city government has limited avenues for generating revenues. A significant part of the revenue is exhausted in meeting operational and maintenance expenditures (see baseline section). Most of the investments are funded through a combination of transfers from the national and state governments. The national and state transfers generally represent more than 50% of the municipal income. Consequently, the financial autonomy of local governments is limited in multiple ways: firstly, the national fiscal system does not consider the different characteristics of cities (taxation cannot be optimized in accordance with local conditions); secondly, national and state governments often explore reducing transfers to cities to address their own fiscal constraints; thirdly, the cities face social pressures which infringe on raising or expanding the scope of municipal fees/taxes.

Lack of capacity of local governments to access and take advantage of existing financing options: In the wake of the first barrier above, cities often turn to options available through national financing institutions. However, local government officials are often not fully aware of the existing options, with no available avenue or support structure to help identify and develop such options. Furthermore, when presented with new revenue options, such as urban expansion for industrial or residential interests, they often have limited capacity to assess the environmental impact or justify an alternative solution in the face of municipal fiscal shortcomings. This is compounded by the fact that they often lack capacity for preparing ?bankable? project proposals to use available options and for accompanying the often-long time periods from project submission through to approval.

Absence of systematic civil society participation in planning processes: In the absence of participation with stakeholders from society and academia, civil servants and decision-makers tend to identify and understand urban challenges from a narrow perspective and their personal experience and knowledge. Under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), the enactment of a Community Participation Law (CPL) was a mandatory reform to be implemented by states and cities. The act proposed to modify the existing two-tier system of urban governance into a three-tier system by adding Area Sabha/Mohalla Sabha (neighborhood level meeting) as the lowest layer. The act assigns important functions such as deciding the priorities of development; identification of beneficiaries of schemes and programmes; suggest locations for establishment of public amenities and a range of other aspects related to urban management. However, most of the functions assigned to Area Sabahs/Mohalla Sabha are either to advise or assist the urban local body. These bodies also do not have any financial autonomy. For instance, the Maharashtra Municipal Corporation and Municipal Council (Amendment) Act 2009 provides only two rights to Area Sabha/Mohalla Sabha - (i) seeking information from the Ward Councilor and any official who is linked with any kind of work that is being carried out in the Area or influences the Area and (ii) to have the attendance of ward-level officials related to public services during the meeting or on need. The community participation acts implemented in India do not fulfil the requirements put forward by the stipulation of the law envisaged under JNNURM. In fact, CPL didn?t have important functions such as power to provide utilization and completion certificates by Area Sabha/Mohalla Sabha to agencies undertaking public works in their jurisdiction.

Local jurisdictions lack access to a national platform that disseminates innovations, experiences, good practices and lessons learned on sustainable urban development from cities in India, Asia and the rest of the world: Such platforms facilitate networking among technicians and decision makers from different cities in India and beyond, as well as effective lobbying to other governmental levels (provinces and national government) to support sustainable policies through legislative changes and financial resources. They also provide a privileged entry point to investors interested in urban sustainability and a community of practice for the deployment of collaborative planning and co-creation design. Connecting to existing global platforms, such as those developed by the Global Environment Facility, the World Bank, the United Nations, WRI, ICLEI and C40, would support local practitioners to build upon lessons and experiences of peers across the globe, facilitating technological leapfrogging. National platforms can also play a role in supporting Indian cities to stay abreast of international developments and incorporate global guidance and good practices and align with international protocols and conventions.

Lack of institutional relationship with university/research centres: Most of the City authorities have not developed any institutional linkages with local/regional research institutes, universities or think tanks that work on sustainable urban solutions. Though there are examples of city authorities (e.g., Ahmedabad, Delhi) using expertise on local universities and institutes for specific tasks in specific structure, there is no planned and institution wide engagement. Such engagement can provide the city authorities with continuous sources of national and international knowledge as well as provide expertise.

# b. The Baseline Scenario and any associated baseline projects

A.  Constitution and delegation of urban authority

Urban development has been assigned to the State governments by the Constitution of India. The 74th amendment to Indian constitution formally recognized urban local bodies as third tier of government and mandated that state governments transfer a set of functions under 12th Schedule to urban local bodies - urban planning, including town planning; regulation of land use and construction of buildings, roads, and bridges; the provision of water; public health; and sanitation and solid waste management etc (Ahluwalia, 2017)[1].

[1] https://www.tandfonline.com/doi/full/10.1080/07352166.2016.1271614

The Ministry of Housing and Urban Affairs (MoHUA) is the apex level authority at Government of India (GoI) level that formulates policies; supports and finances centrally sponsored programmes; and coordinates with Ministries at GoI level and departments at State level on issues related to housing and urban affairs. Major programs managed by MoHUA in the last decades include the schemes of Integrated Development of Small and Medium Towns (IDSMT), the Accelerated Urban Water Supply Program (AUWSP), the Mega Cities Project (MCP), the Urban Reform Incentive Fund (URIF), the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and more recently, Smart Cities Mission, AMRUT, HRIDAY etc.

Given that urban development is a state subject, the state government has an important role in not only providing functions, funds, and functionaries, but also providing support through legislations, institutions, and reforms. While several functions under the 12th Schedule have been devolved to Urban Local Bodies (ULBs) by many states, important functions such as urban planning and land management continue to be vested with the state government departments ? as planning is a powerful instrument to mobilize resources to meet the investment requirements. State governments have also extended regulatory and supervisory powers over ULBs. Parastatal agencies often bear the responsibility of providing urban services - e.g., public works departments/urban development authorities, state-level boards (e.g. water supply and sewerage boards/housing boards, etc.), statutory and non-statutory bodies at the city level (e.g. metropolitan water supply boards/development authorities) etc.

ULBs  heavily depend on the functions, powers and funds devolved by state governments. In many cases, capital works for urban infrastructure are undertaken by state government departments, whereas

responsibility for operation and maintenance lies with the ULBs. In many large cities, municipal corporations also provide capital investment financing for these services.

B.  Indian cities

Urban areas in India are divided into three categories(see Figure 5 for typology of Indian cities):

• Statutory Towns ? enacted by a statute of the state government and should have an elected ULB. As per the Census of India, there were 4041 Statutory Towns in India (a marginal increase from 3799 in 2001). All ULBs are Statutory towns defined by the State laws, which enables the creation of different kinds of municipalities.
•Census Towns - the second category of urban areas is Census Towns (CT). These are defined by Registrar General of India on the basis of three specific characteristics:
(i)        Population of at least 5,000

(ii)       Population density of at least 400 persons per sq.km, and

(iii)      At least 75 % of male main workforce in non-farm sector

•Outgrowths - the third category is Outgrowths (OG) which are part of some urban areas or an enumeration block[2] that come up near a statutory town outside its statutory limit but within the revenue boundary of a village or villages contiguous to the town or city. The OG is also administered by RLB (Joshi and Pradhan, 2018)[3].
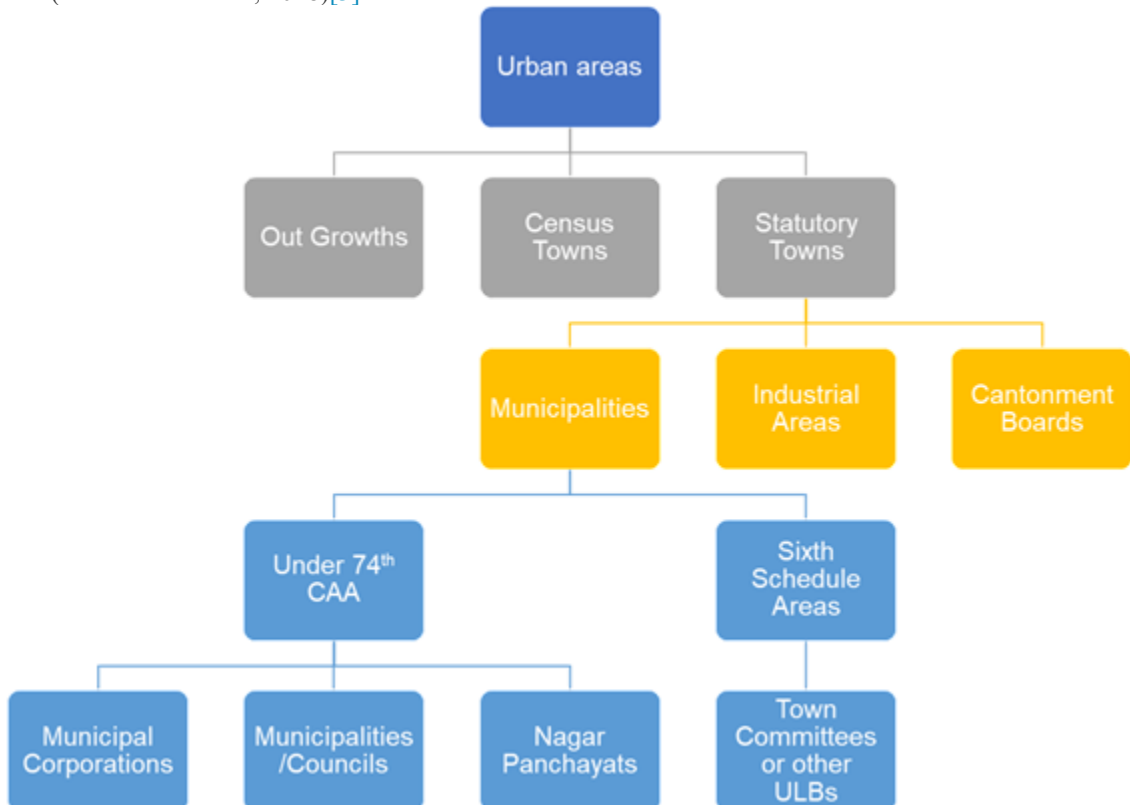
Figure 5: TYPOLOGY OF URBAN AREAS IN INDIA

This peri-urbanization and the new developments with low density in Indian cities has led to land degradation, loss of biodiversity, resource depletion and high levels of GHG emissions. Urban pollution has caused 120,000 premature deaths in six Indian cities with an economic cost of $8.1 billion in 2020[7]. Largely ineffective and broad-brush planning and regulations are leading to destruction of lakes, encroachments of lake beds, closure of natural drainage channels that further lead to flooding during the monsoons (IIHS, 2015)[8]. With the rapid growth of peri-urban areas in Indian cities and the lack of capacity to provide basic services to these areas by rural local bodies, peri-urban neighborhoods depend on groundwater for drinking purposes and poorly designed soak pits and septic tanks for sanitation facilities. These poorly designed sanitation facilities interfere with the water bodies and aquifers which leads to water pollution.

Energy demand: India?s energy demand will grow to 18,125 Twh/year by 2047 in a determined effort scenario. With better urban planning, 45 % of residential area will be high rise buildings and 41 % under horizontal development by 2047. With compliance of building energy efficiency codes etc. will result in 2,287 Twh/year of electricity demand by 2047 in comparison to 238 Twh/year in 2012. The industry energy demand will grow to 9,920 TWh/year (about 50% of the total energy demand)[12].

Urban Mobility: Changes in urban mobility are uncertain. Despite the sustained efforts to improve public transport and promote cycling, local authorities face difficulties in putting limits on private car use to address the pressure from ever-growing motorization rates in India. Public transport financing and infrastructure investment (which would require an involvement of the national government and state government, following the path initiated in urban rail projects in most tier 1 cities in recent years) require new responses from national decision makers.

Waste: According to 2016 estimates, India generated about 270 million tons of annual municipal solid waste, which was about 13 % of the global waste. This is projected to increase to 543 million tons in 2050[13]. On waste, some cities are making progress on recycling and waste segregation. However, it is projected that without more stringent regulations and a new approach to waste management, Indian cities will face greater pressures in managing solid waste, leading to increases in landfills and related land and air contamination.

## C. Policies, plans, regulations, and legislation on urbanization

| Policy, plan, law, regulation | Description |
|---|---|
|  |  |

| National Mission on Sustainable Habitat | **Goals:** |
|---|---|
| | ?     To promote Improvements in **energy efficiency in buildings** through extension of the energy conservation building code - which addresses the design of new and large commercial buildings to optimize their energy demand |
| | ?     To create and adopt a more holistic approach for solid and liquid waste management, ensuring their full potential for energy generation (conversion of solid waste into energy), recycling, reusing and composting. |
| | ?     To encourage **modal shift to public transport** and encourage NMT. |
| | ?     To make **urban areas more climate friendly** and less susceptible to climate change by a multi-pronged approach to **mitigate and adapt** to it. |
| | ?     To encourage community involvement. |
| | ?     Conservation through appropriate changes in legal and regulatory framework. |
| | ?     It aims to develop sustainable habitat standards, city development plans, comprehensive mobility plans that addresses resilience and climate change related challenges and undertake Capacity building |
| | The mission is Governed by the Ministry of Housing and Urban Development (MoHUA). The National Mission on Sustainable Habitat was approved by the Prime Minister?s Council for Climate Change in June 2010. This mission has manifold agenda to mitigate GHG emissions and achieve sustainability. |
| | **Funding:** |
| | No specific funds have been allocated or are sought for the Mission on Sustainable Habitat as it is being **implemented through the four flagship missions/ programmes** of the Ministry of Urban Development, namely **Atal Mission on Rejuvenation and Urban Transformation** (AMRUT), **Swachh Bharat Mission** (SBM), **Smart Cities Mission** (SCM) and **Urban Transport Programme**. |
| | ?     Atal Mission on Rejuvenation and Urban Transformation (AMRUT) |
| | o   The Mission aims to provide basic civic amenities like water supply, sewerage, urban transport, parks as to improve the quality of life for all. |
| | o   The focus of the Mission is to create infrastructure with aim to |
| | ?     Ensure that every household has access to a tap with assured supply of water and a sewerage connection |
| | ?     Increase the amenity value of cities by developing greenery and well-maintained open spaces e.g. parks and |
| | ?     Reduce pollution by switching to public transport or constructing facilities for non-motorized transport e.g. walking and cycling. |
| | o   Funding |
| | ?     Total outlay for AMRUT is Rs. 50,000 crores for five years from FY 2015-16 to FY 2019-20 |
| | ?     The AMRUT may be continued thereafter in the light of an evaluation |

| | |
|---|---|
| National Missions under National Action Plan on Climate Change (NAPCC) | The National Action Plan on Climate Change (NAPCC) was released by the Honourable Prime Minister of India in June 2008. NAPCC aims to create awareness on the threat posed by climate change and the steps to counter it among the representatives of the public, different agencies of the government, scientists, industry, and the communities. The Action Plan Outlines 8 core Missions to achieve the set target. Some of these are:<br><br>?     National Solar Mission (NSM) or Jawaharlal Nehru National Solar Mission (JNNSM)<br><br>?     National Mission for Enhanced Energy Efficiency (NMEEE)<br><br>?     National Mission on Sustainable Habitat (NMSH)<br><br>?     National Mission for A Green India (NMGI)<br><br>?     National Mission on Strategic Knowledge for Climate Change (NMSKCC) |
| National Solar Mission (NSM) | The Mission is implemented by the Ministry of New and Renewable Energy. It was launched in 2010 with the primary aim of achieving grid parity by 2022 and with coal-based thermal power by 2030. Since its inception, the mission has been revised twice to include 100 GW of solar PV by 2022.<br><br>?     The mission takes the measures for Creating conditions for research and application in the field of solar technology and support & facilitate the already on-going R&D projects.<br><br>?     It promotes decentralised distribution of energy by creating cheaper and more convenient solar power systems.<br><br>?     Emphasis on manufacturing solar panels at the local level and to tie up local research with international efforts.<br><br>?     Seeks to reduce the absolute cost of solar energy to bring it down and make it affordable.<br><br>?     Making solar water heaters mandatory in buildings to promote the already proven and commercially viable solar heating systems.<br><br>?     By the remote village electrification programme, using solar power as an off-grid solution to provide power to the power deprived poor.<br><br><br>Funding:<br><br><br>National Solar Mission invites investment worth Rs 5,000 crore. The average bid amount in the domestic content and open category was Rs 2.13 crore per unit and Rs 1.06 crore per unit respectively against the proposed government funding of Rs 2.5 crore per unit. |

| | |
|---|---|
| National Mission for Enhanced Energy Efficiency | Goals of the Mission are:<br><br>?     Market-based approaches to unlock energy efficiency opportunities worth INR 74,000 crores.<br><br>?     Annual fuel savings of more than 23 million ton.<br><br>?     Cumulative avoided electricity capacity addition of 19,000 MW<br><br>?     CO2 emission mitigation of 98 million tons per year<br><br>**NMEEE consists of four initiatives** to **enhance energy efficiency in energy intensive industries** which are as follows:<br><br>?     **PAT (Perform, Achieve and Trade):** improving efficiency in energy intensive sectors.<br><br>?     **EEEP (Energy, Efficiency Financing Perform):** Providing platform for capacity enhancement of stakeholders related to EE financing.<br><br>?     **MTEE (Market Transformation for Energy Efficiency):** accelerating shift towards energy efficient appliances<br><br>?     **FEEED (Framework for Energy Efficient Economic Development)** of fiscal instruments to promote energy efficiency. |
| National Mission for A Green India | **Goals**<br><br>?     To increase forest/tree cover to the extent of 5 million hectares (mha) and improve quality of forest/tree cover on another 5 mha of forest/non-forest lands;<br><br>?     To improve/enhance ecosystem services like carbon sequestration and storage (in forests and other ecosystems), hydrological services and biodiversity; along with provisioning services like fuel, fodder, and timber and non-timber forest produces (NTFPs); and<br><br>?     To increase forest-based livelihood income of about 3 million forest dependent households.<br><br>The mission is Governed by the Ministry of Environment, Forest and Climate Change. It has the mandate of reviving degraded forest land with a focus on increasing forest cover & density and conserving biodiversity.<br><br>The mission Works towards reducing fragmentation of forests, enhancing private public partnerships for plantations, improving schemes based on joint forestry management etc; and Makes plans to tackle the challenges posed by climate change. |

| | |
|---|---|
| National Mission on Strategic Knowledge for Climate Change | ?     Governed by the Department of Science and Technology. <br><br> ?     It identifies challenges and requisite responses to climate change. This will be done through open international collaboration and would ensure sufficient funding for this research. <br><br> ?     There is a need for a strong strategic knowledge system on climate change. <br><br> **Goals:** <br><br> ?     Develop regional climate science. <br><br> ?     Leverage international cooperation. <br><br> ?     The efforts undertaken here would feed into the Indian National Network for Climate Change Assessment (INCCA) which is a stocktaking exercise conducted every two years as part of the national obligations under UNFCCC. <br><br> ?     Creation of a **data generation and sharing system** by mapping resources on knowledge relevant to climate change. <br><br> ?     **Identifying knowledge gaps** and inspiring from global technological trends to select and test technologies. <br><br> ?     Creating new centres dedicated to climate research within existing institutional framework. <br><br> Fund requirements for the National Mission on Strategic Knowledge for Climate Change would be supported through two streams namely, internal resources in case of ongoing activities or through earmarked resources for climate change related actions by various arms of government. |
| HRIDAY: Heritage City Development & Augmentation Yojana | The main objective of HRIDAY is to preserve the character of heritage city and facilitate inclusive heritage linked urban development by exploring various avenues including involving the private sector. <br><br> ?     Governed by the Ministry of Housing and Urban affairs. The Scheme was launched in January 2015. <br><br> ?     Preserve and revitalize the soul of the heritage city to reflect the city?s unique character by encouraging an aesthetically appealing, accessible, informative & secured environment. <br><br> ?     To undertake strategic and planned development of heritage cities aiming at improvement in overall quality of life with specific focus on sanitation, security, tourism, heritage revitalization and livelihoods retaining the city?s cultural identity. <br><br> The scheme would be implemented in a mission mode with a budget of Rs 500 Crore. Each city was granted a specific amount of funds, based on its population and size. |

Actors/institutional arrangements

Key actors promoting sustainable urban development in India are depicted below (Figure 6 gives a diagrammatic sketch of the institutions):

**GoI level:** The Government of India has a supervisory, support and policy-making role. Through the Ministry of Urban and Urban Affairs (MoHUA), GoI formulates policies, funds, and supports programs, coordinates the activities of various central ministries, state governments and other nodal authorities, and monitors the programs concerning all the issues of urban development and housing in the country. Policies and regulations by other ministries such as Ministry of Environment, Forest and Climate Change (MoEFCC), Ministry of Power (MoP), etc. also influence the investments in the cities as well as the control regulations for development.
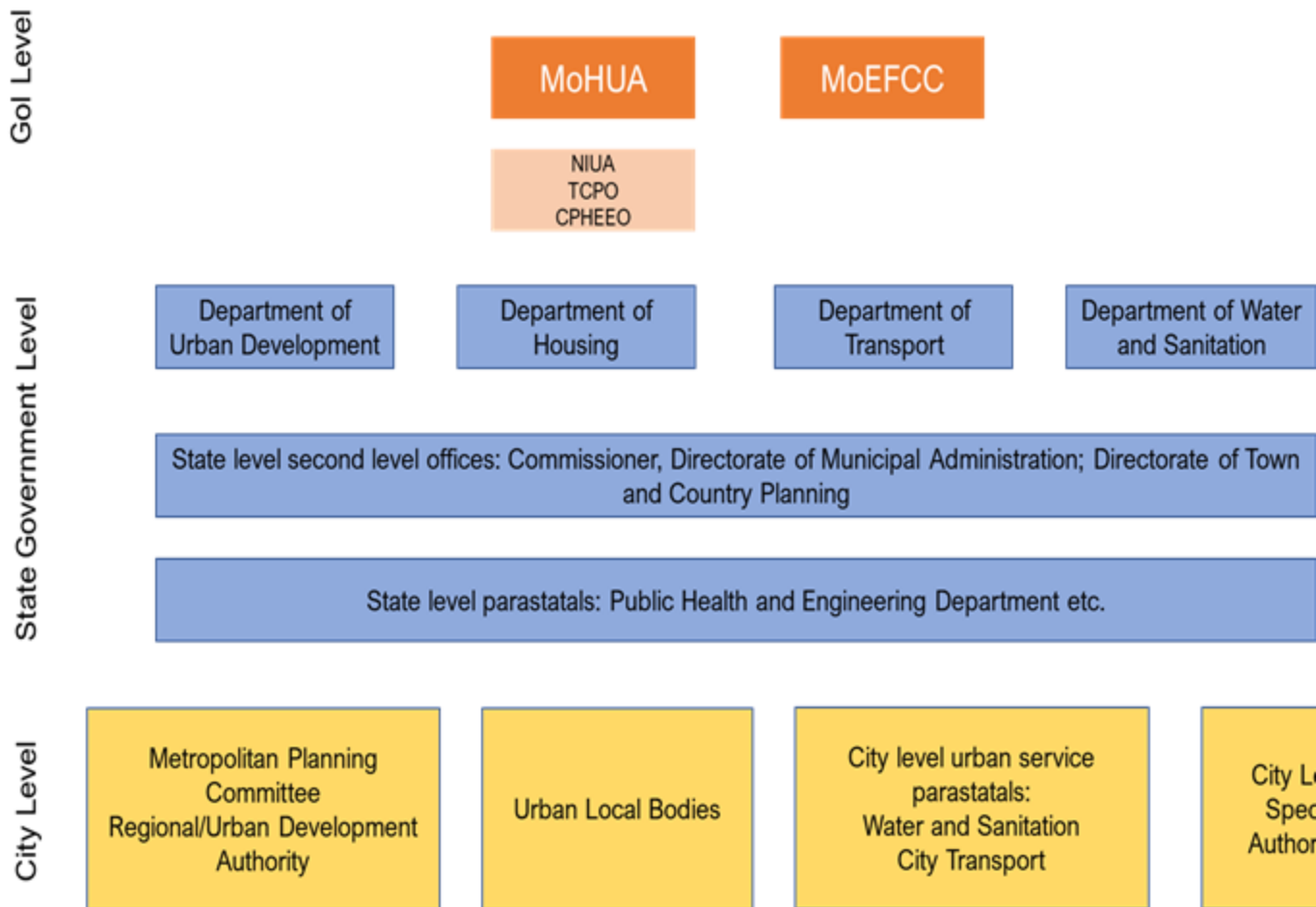


Figure 6: KEY GOVERNMENT BODIES WITH MANDATES FOR URBAN DEVELOPMENT

**State Level:** At the level in the state government, urban development is looked after by various state departments. The Urban Development Department, the Municipal Administration Department, the

Housing Department, the Water Supply and Sanitation Department and the Transport Department. Depending on the state, some of the departments are merged and a single entity would look after the functions of all the above-mentioned departments. For instance, urban development and housing are under the same department in Gujarat, while Karnataka has separate departments for these functions. Further, urban transport is managed by the Urban Development Department and the Transport Department. In many instances, city bus services fall under the purview of the Transport Department.

**Directorate/Commissionerate/Secretariat:** These institutions are constituted based on the business allocation rules of the state departments. They primarily act as the administrative and technical arms of the state departments for specific functions. For example, the Directorate of Town and Country Planning (Telangana/Andhra Pradesh), the Directorate of Urban Land Transport (Karnataka), the Commissionerate of Municipal Administration (Tamil Nadu/Andhra Pradesh/Telangana), etc.

**State parastatal:** These institutions are generally constituted under the provisions of certain State Acts and provide certain urban services in the state. They have their jurisdiction across the state (with or without exceptions in some places). For example, the Public Health and Engineering Department.

**State-owned companies/body corporates:** These institutions are created under the Companies Act/Societies Act and have a management board composed of state-appointed officials. These institutions have separate accounts and are responsible for specific functions. Their jurisdiction is defined under the articles of association of the company. For example, the Karnataka Urban Infrastructure Development and Finance Corporation, the Tamil Nadu Urban Development Fund, etc.

**City parastatal:** These institutions can be of two types ? (i) planning or development authorities responsible for development/master plans, and (ii) water supply/ sewerage boards at the city level responsible for the development and O&M of water supply and sewerage networks. They have their jurisdiction across the city region and perform functions assigned to them under the State Act. For example, the Surat Urban Development Authority, the Hyderabad Metropolitan Water Supply and Sewerage Board, etc.

**Urban local bodies:** These institutions are constituted under the State Municipal Act. They have their jurisdiction across the municipal areas of the city and perform functions assigned to them under the Municipal Act. For example, the Surat Municipal Corporation, the Pune Municipal Corporation etc.

**Special purpose vehicles:** These institutions are created under the Companies Act/Societies Act by the state/city authorities for specific projects. The SPVs, generally, ring-fence the project from the balance sheet of the parent organization and allow the project to be taken up on its own financing strength. Public-private partnership (PPP) projects are mostly implemented through the SPV route. For example, the Maha Metro Rail Corporation, Pune Smart City Pvt Ltd etc.


E.   Planning process and Regulatory Framework for guiding urban development

•
•The Urban planning laws vary by states as it is a state subject. The Urban Development Authority (UDA), such as SUDA and Pune Metropolitan Region Development Authority (PMRDA), a state government entity is responsible for developing the master plan for the delineated urban development

area every 20 years. The plan attempts to address a variety of issues ? infrastructure development, housing, transportation, heritage protection, economic development, environmental protection/regulations etc. The Master Plan typically includes preparation of land use plan which identifies the surrounding areas and peri-urban areas into which the city is expected to expand. Based on the estimated population growth, the identified land area will be rezoned into non-agricultural purposes such as residential, commercial, industrial etc. This is the first tier of planning.

Planning of smaller units of land (zonal/local area plan/town plan schemes) and other infrastructure (public transport, industrial areas, other civic services) is carried out by a multitude of entities. The local area plans for smaller units in some states is undertaken by the UDA or by the town planning department of the City authority. In general, for municipal areas the local area planning is done by the municipal department and within the mandate of the municipal authorities. Most of the other infrastructure in the city, except for development of roads which is under the jurisdiction of Municipal authorities, is undertaken by state government entities.

The implementation of the plan is through the Development Control Regulation (DCR). DCRs control the new urban growth/new development as per the standards stipulated in the Development Plans. DCR controls the development and use of land, the construction of new buildings, the extension of the existing ones, and the change of use of the building or land to another use.

DCR (both Zoning regulations and building by-laws) are a separate document (approved as part of the Master Plan and zonal/local area plans). One or more regulations/bye laws can be amended or revised through a Government Order. The authority for review of DCR provisions are with Metropolitan Commissioner except for the provisions associated with FSI, which is set by the State Government.

There are two main DCRs, viz., Zoning regulations and Building By-laws. Zoning regulations deal with allocation of land for various purposes and control of the use, height, and construction of the building. The objective of the Zoning Regulations (ZR) is to enable planning authority to design the future growth in sustainable manner. ZR allows for proper coordination of various public amenities such as road, electricity, drainage, water connection, transport facilities, etc. by restricting the land use. Zoning regulations also allows for re-zoning of particular land parcel for better use by revisiting the zoning ordinances. Building By-laws define the minimum sizes of plots, setbacks (open space between building and plot boundary), ground coverage, building heights, Floor Space Index (FSI), Permissible Projections in Marginal Open Spaces / Distances, parking requirements, etc.

Urban sprawl and high prices of land and housing are often attributed to DCR as restrictions on density, height, and design; building fees; slow approval processes; restrictions on growth; and preservation laws have had significant impact on the amount of land that could be used for development. This resulted in building designs that try to maximize built up space rather than designs that could contribute to sustainability (Munshi et al, 2015)[16]. For instance, front margins on main roads could be removed with and people could be encouraged to do away compound wall to have more space for pedestrians and NMT. The low levels of FSI coupled with focus on revenue maximization has resulted in new developments in peri-urban areas which led to urban sprawl in Indian cities[17].

# F.    Urban Finances

Indian cities finance their urban development through the following ways:

1.    Central and state transfers and programmes

2.    Locally generated income

3.    National and international financing institutions

Indian urban local governments are amongst the weakest in the world in terms of fiscal autonomy and also their capacity to deliver civic infrastructure and services to meet the demands of growing urbanization and rapid economic growth. Municipal revenues/expenditures in India have been stagnating at around 1 % of the GDP for over a decade. This is because the constitutional provisions for devolution in India have been very weak and even the existing provisions have not been implemented. The sources of own revenue of urban local governments are also limited and ineffective. By comparison, for example, the municipal revenues/expenditures in Brazil account for 7.4 % of GDP and in South Africa for 6 %.
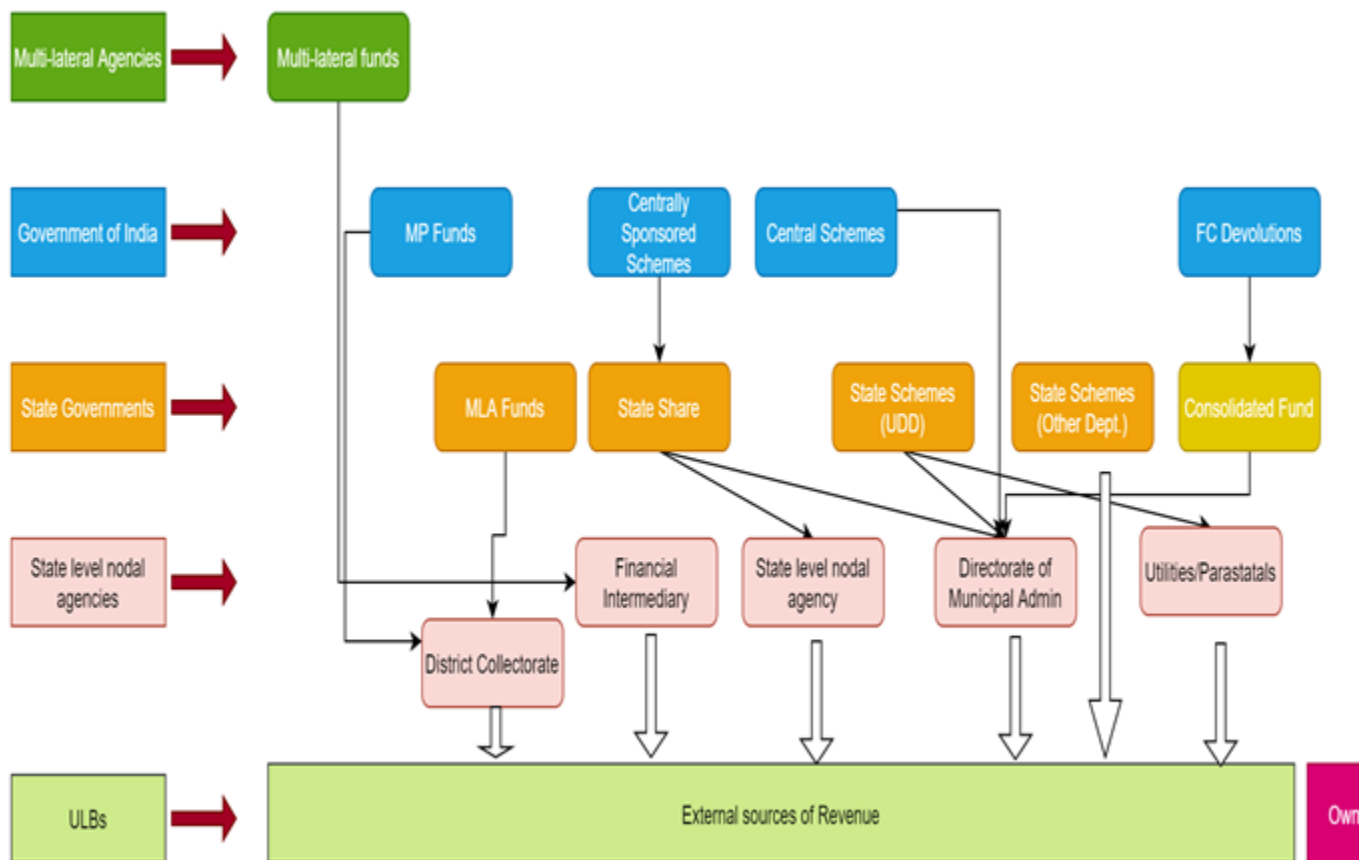


Figure 7: FINANCING OF URBAN DEVELOPMENT

The capacity of ULBs in India to deliver urban services and drive sustainable growth in cities is severely hampered by the weak fiscal autonomy. While state governments have transferred the functions mandated by 74th CAA to ULBs thereby the expenditure are incurred for these mandates by the city authorities, revenue generation mandate has been retained with the state government. The state governments, in most cases, have not provided funds and functionaries to meet the requirements of functions assigned to the ULBs. The unpredictability and discretionary nature of state transfers have further led to continued financial dependence of ULBs on state governments.
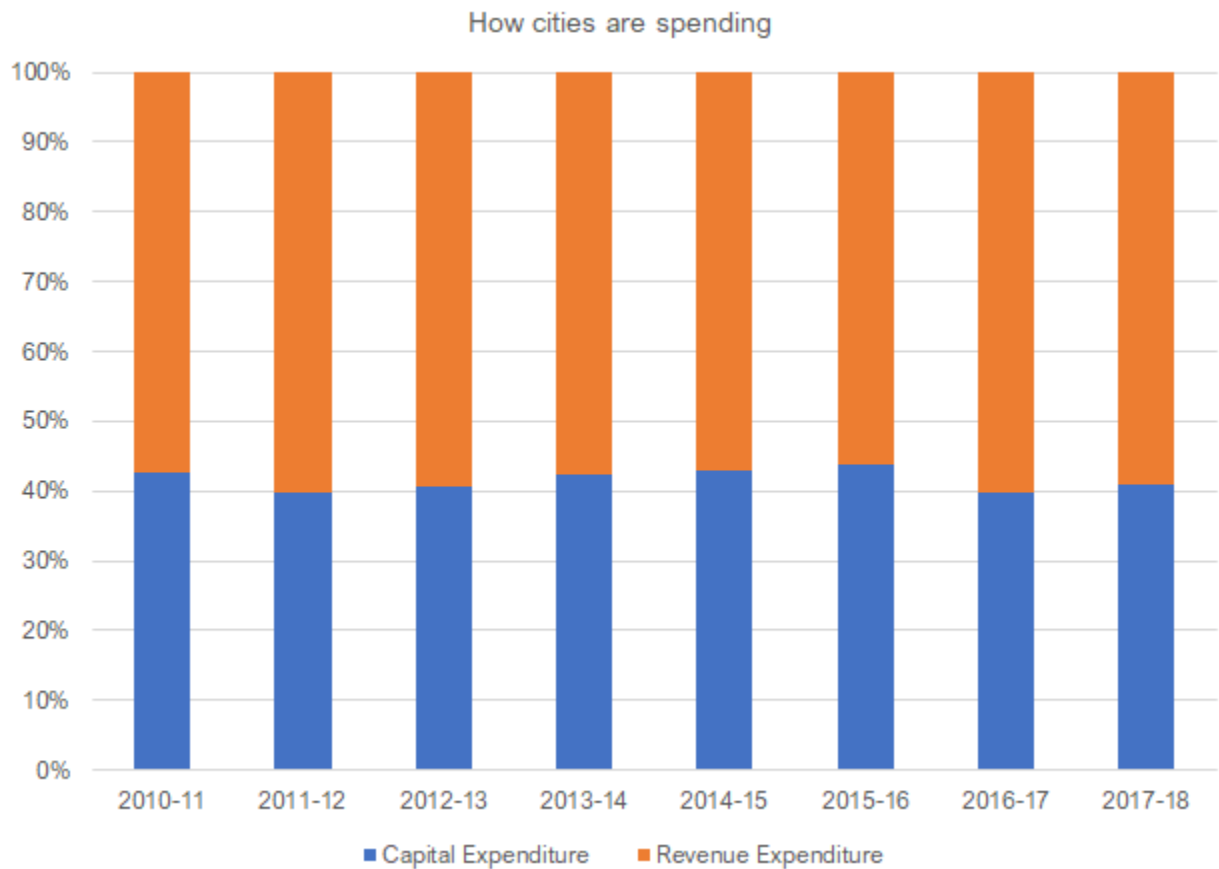


Figure 8: CAPITAL AND REVENUE EXPENDITURE BY CITIES OVER TIME

ULBs in India fund their operations through a combination of their own sources, grants from state governments and funds from central government for centrally sponsored schemes such as JNNURM, Smart Cities, AMRUT etc. Municipal revenue collected accounts for 42% of total budget of ULBs in India, whereas state and central transfers account for 44% in 2017-18. The total amount of revenue and capital expenditure also remained stagnant at 0.8% of GDP. A key source of revenues for ULBs was Octroi (tax levied by ULBs on goods imported into the city limits for sale). The Octroi was subsumed within the Goods and Sales Tax (GST) which is levied by the Central government. While the state governments compensate for the loss of revenue, the predictability of the amount and timing hinders

the planning of investments. The limited autonomy to increase taxes and user charges further reduces the fiscal capacity of the ULBs.

As shown in Figure 9 below, ULBs do raise funds from the market borrowings but this forms a small part of total budget of the ULBs. It also forms a very small and declining part of the total investment in infrastructure. As per the estimate of credit rating agencies, annual municipal bond issuance is likely to be at the level of Rs 3,000 crore (~400 million USD) for the next three years. This amount is unlikely to meet the requirement for investments. The capacity of the ULBs to borrow is limited by the fact they are needed to balance their budget by law and can?t undertake deficit financing. The majority of investment funds come from central and state government schemes. The ULBs are challenged in utilizing these funds if the funding doesn?t cover the total investment costs for the project. For example, the Smart Cities Mission and AMRUT schemes requires ULBs to mobilize other resources including private investment to complement the funds provided by the schemes. As a result, the actual expenditure is therefore much lower than the required expenditure for both capital investments and O&M. Indian cities thus have limited traditional resources to invest in integrated sustainable urban development.
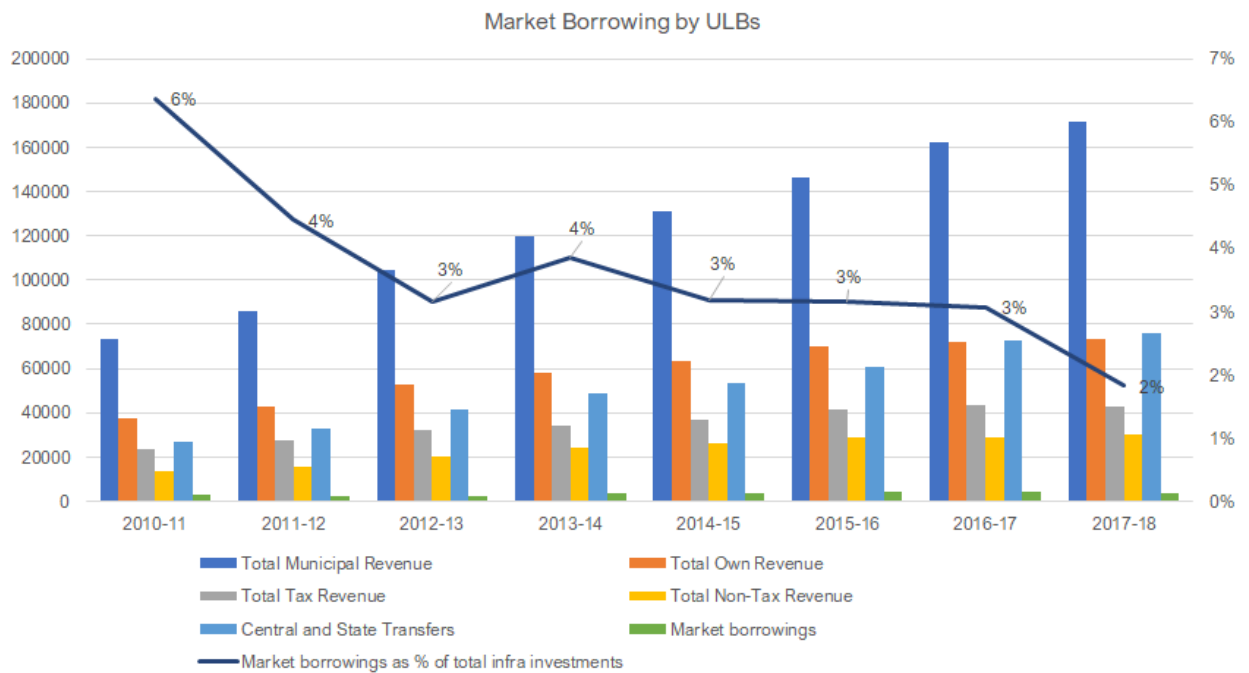


Figure 9: MARKET BORROWINGS BY CITIES OVER TIME

Coordination with Baseline Project

GEF 6 - Sustainable Cities, Integrated Approach Pilot in India (GEF6-IAP Program) ? The project will coordinate closely with the GEF 6 project and built upon the work undertaken by the project. The project will specifically build upon the following deliverables developed as part of the GEF-6 project:

(i)        Guidance and methodology for sustainability plan development.

(ii)        Risk and Vulnerability maps and management plans to draw lessons for work specifically in Chennai and Surat.

(iii)        Share the investment plans developed for reducing GHG emissions through component 4 activities.

(iv)        Link  the project KM platform with the project KM platform.

At the onset of the project implementation a meeting will be organized with the GEF6-IAP Program team to identify the deliverables that could be used as part of the project and built upon. The Team will also be invited as part of the Donor Coordination team for regular information sharing and identifying work of the programme that could be leveraged for SCIP India project
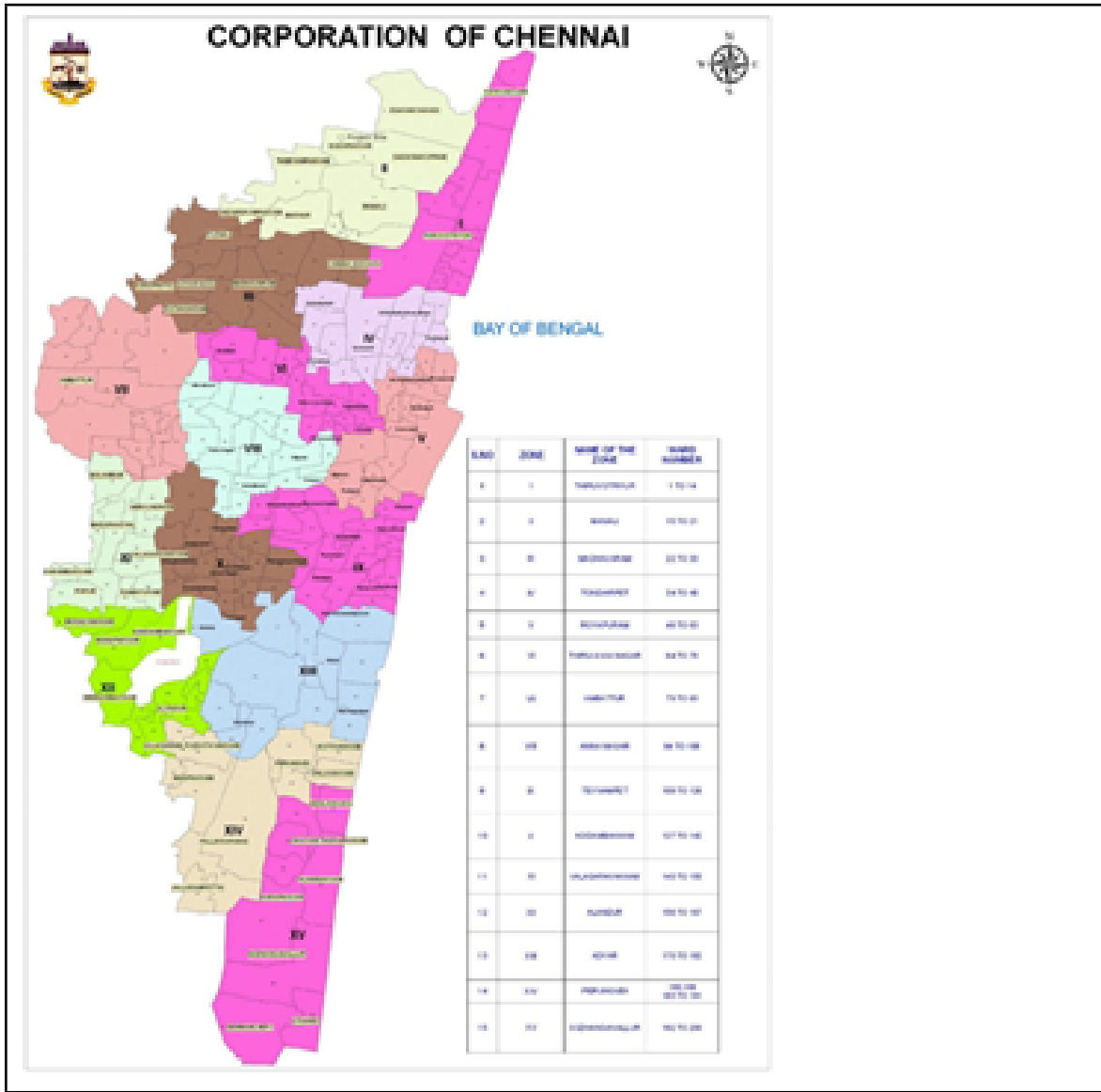
# I. Target cities

## I.1 Chennai

Chennai, formerly Madras, is the capital of Tamil Nadu state, southern India, on the Coromandel Coast of the Bay of Bengal. Known as the ?Gateway to South India?. Chennai is the fourth largest metropolitan city in India and is geographically a flat coastal plain having average elevation of about 6.7 meters. The northern part of Chennai is primarily an industrial area, and the central part is the commercial heart of the city, whereas South and west Chennai are mostly residential areas.

Chennai has seen the same urban growth dynamics as the rest of urban India with population growth averaging at 24% per decade since 1901 and peaking at 65% in the 1940s. This has seen Chennai grow from a town of 230 thousand people in 1901 to a mega-city of over 7.6 million in 2020.

Chennai features a tropical wet and dry climate. Chennai lies on the thermal equator and is also coastal, which prevents extreme variation in seasonal temperature. For most of the year, the weather is hot and humid. The hottest part of the year is late May and early June, with maximum temperatures around 38?42 ?C (100?108 ?F). The coolest part of the year is January, with minimum temperatures around 18?20 ?C (64?68 ?F). The lowest temperature recorded is 13.9 ?C (57.0 ?F) and highest 45 ?C (113 ?F) (30 May 2003).

Chennai has experienced severe impacts from climate change in the past two decades. The intensity and the frequency of these extreme events indicate that climate change is altering Chennai's weather patterns. Between 2004 and 2011, Chennai experienced eight consecutive years of excessive rainfall from the northeast monsoon. For three years since 2011, Chennai experienced drought, with 2013 recording a 33% deficiency of rain, according to data from the India Meteorological Department. Chennai faced one of the largest floods in 2015, which led to damages amounting to US $3-14 billion. The year after the 2015 floods, Chennai saw its worst drought in 140 years. Chennai received 62% less

than usual rain during the 2016 northeast monsoon, the city's primary rain season. 2017 and 2018 were also drought years, with water scarcity reaching a peak during the summer of 2019.



**Summary Data**

Population: 7.6 million

Key economic industries: Services & Manufacturing

State Tamil Nadu

Part of metropolitan area: Part of Chennai Metropolitan Area that is 1189 sq.km.

Greenhouse gas emissions 2.4 million tCO2e (2017 local inventory);

Integrated planning platform: Integrated command and control centre

Key strategic plans: Comprehensive Mobility Plan, Chennai Master Plan 2026

Key institutional actors: GCC (GCC), Chennai Metropolitan Water Supplly & Sewerage Board (CMWSSB), Public Works Department (PWD), Revenue Department

Member of 100 Resilient Cities

Member of C40 Cities Climate Leadership Group

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*Key institutional arrangements on urban planning and key planning instruments*

The function of Urban Planning in the Chennai Metropolitan Area (CMA) is done by Chennai Metropolitan Development Authority (CDMA), a state government entity. Under this, master planning is done for the overall area of 1128 sq. km, and detailed development plans are developed for every ward. The institutional landscape in CMA is as per constitutionally prescribed ULB structure with the municipal bodies at the top. They are under the Municipal Administration and Water Supply Department (MAWS) of the Government of Tamil Nadu (Table below).

This planning is done after periodic discussions with the various stakeholders in the city, and includes the following major departments with their roles and functions:

| Department | Current Function | Inputs in the Master Plan | Parent State Agency |
|---|---|---|---|
| Greater Chennai Corporation (GCC)[1] | ? Solid Waste Management<br><br>? Storm Water Drain Network Management | Demand & Supply of the various services | Municipal Administration & Water Supply (MAWS) |

| | | | |
|---|---|---|---|
| Chennai Metro Water Supply & Sewerage Board (CMWSSB) | ? Water Supply<br><br>? Sewerage | Demand & supply of various services | MAWS |
| Public Works Department (PWD) | ? Management of rivers and BC Canal | Flood Plain and Seasonal Flow Planning | State Government Department |
| Chennai River Restoration Trust (CRRT) | ? Restoration of Rivers in the City | | MAWS |
| Tamil Nadu e-Governance Agency (TNEGA) | ? Spatial platform for all the departments of Government of Tamil Nadu | Provide Integrated Platform for Spatial Visualization | Department of Information technology, State Government |

Chennai also has governance fragmentation in many areas of service delivery. For example, the GCC is responsible for storm water drains, the role of water supply & sewerage is performed by Chennai Metropolitan Water Supply & Sewerage Board (CMWSSB) which is not hierarchically related. Likewise, rivers are controlled by the Public Works Department (PWD). Ownership of water bodies is distributed between GCC, The Hindu Religious and Charitable Endowments Department, Revenue Department, and PWD. There is no overarching authority for water management leading to some unconnected and unstructured planning efforts.

CMDA works closely with Greater Chennai Corporation (GCC) and other stakeholders listed above to prepare detailed maps based on the departments' requirements and challenges. The GIS-based land-use system assists in planning and offers various information, including a list of notified areas, locations identified as IT corridors, and places falling under MRTS in the Chennai Metropolitan Area (CMA). The map system also has tools listing pockets falling under the Coastal Regulatory Zone, artificial recharge area, Catchment Areas, Ministry of Defense restricted land, major transport corridors, Green Belt, Archaeological Survey of India (ASI), etc. .[2] This assists in allocating land for various purposes, including restricting construction near floodplains and water bodies.

One of the primary functions of the GCC is Storm Water Management. To deliver this function, the GCC has undertaken the larger basin level drainage planning exercise with stakeholders like CMDA and utilizing high-resolution satellite imagery from the Institute of Remote Sensing (IRS), Anna University. Due to the fairly flat terrain of the city, which is at average 6m above mean sea level, the department undertook the Aerial Laser Terrain Mapping Exercise (ALTM) for Chennai to improve its accuracy in drainage planning. (ALTM Vertical Accuracy - 10mm) Based on this exercise's output, consultants have worked to create a detailed drainage map (natural & artificial) to handle storm outflow. Additionally, the GCC carries out Vulnerability Assessments periodically to determine areas

of the city that are more prone to damage. This spatial information is plugged back into the planning process for providing newer drains and diverting the rainwater to the nearest water bodies.

The Integrated Storm Water Design & Development is an outcome of this planning process. Every water body within the city is connected by a series of overflow gates and canals with the stormwater drain network. This approach has significantly reduced flooding in recent times for the city. The spatial planning system also enables GCC to conduct preventive-maintenance activities in the water bodies and the canals by way of dredging and improving wall structures etc.

There is a multiplicity of central and state government agencies, urban local bodies, rural bodies and district level bodies that govern within a metropolitan region. This results in ?duplication of functions? and ?overlapping jurisdictions?. This holds true for Chennai as well where Tamil Nadu Water Supply and Drainage Board (TWAD) and CMWSSB are involved in the provision of water and sanitation facilities. The local bodies are also looking after the provision of these services in a number of smaller urban and rural constituents of peri-urban CMA. The District Planning Committee and CMDA are present for integrated planning; however, there is no provision for an MPC. Also, the District Planning Committee is not making any plan in the CMA region.

The same fragmented governance in the water sector, also has cascading impacts on the quality of delivery in other sectors, including air quality, health, energy, transport etc.

*Key challenges to sustainable urban development*

Prior to 1975, Chennai city did not have a comprehensive master plan, as the city needed to accommodate more people and the need for associated infrastructure increased, natural areas were constructed upon, without attention to the functions of those ecosystems or to the long-term impact of losing them, including the impact of losing their function in mitigating city disaster risks. Driven by population growth, economic transition, and development, the city has been experiencing urban land use expansion at an unprecedented rate. A 2009 study assigned Chennai 37th place in the list of largest urban areas in the world (see Figure 10 for decadal growth rate and population increase in Chennai). To accommodate the rapidly increasing population, the GCC expanded its jurisdiction to 426 sq. km in 2011, prior to which it covered an area of 174 sq. km. Currently, the state government is considering a further expansion of the Chennai Metropolitan Area (CMA) to nearly eight times its current size (from 1,189 sq. km to 8,878 sq. km). While there have been master plans to shape the growth, these have not been effective or well thought through, aggravating the natural and human-made shocks and stresses the city experiences, including floods, pollution, and encroachment.
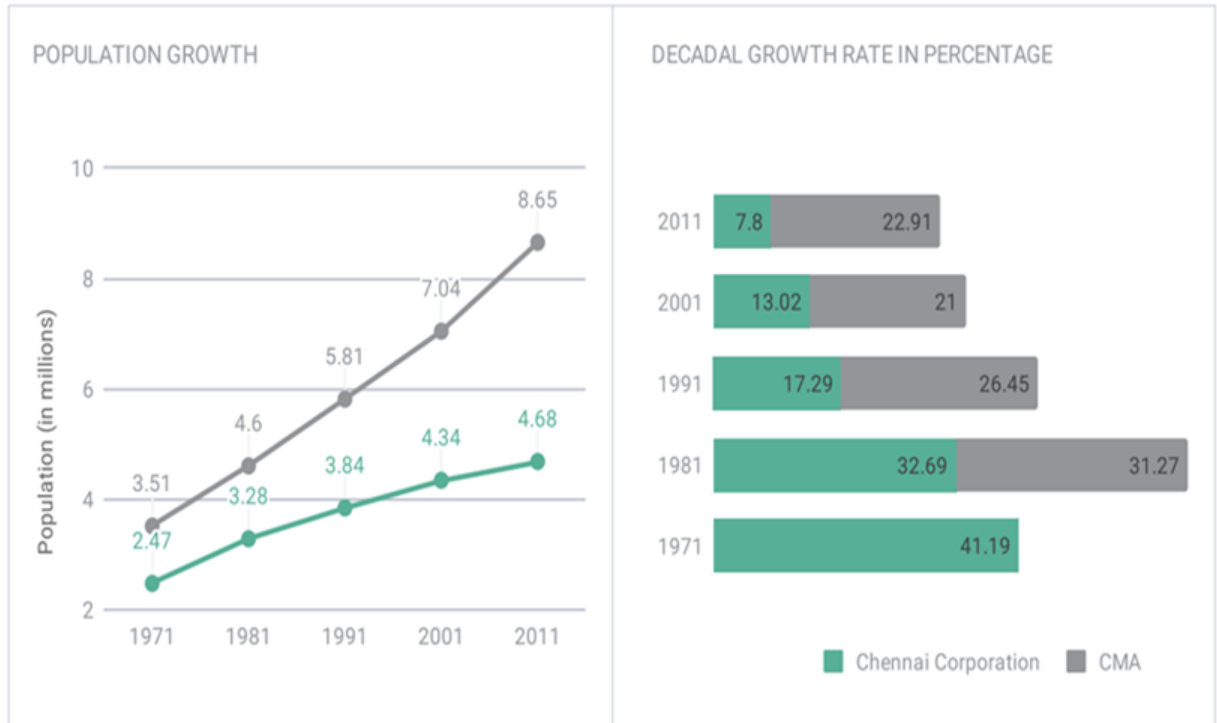
Figure 10: CHENNAI?S DECADAL POPULATION GROWTH

This rapid increase in population has seen a significant impact on natural resources.

Rising Energy demand. Chennai?s emission intensity per capita is less than half of the average of other mega cities in the Asia Pacific region, due to the large population base its total emissions are about 15% above the average.  Compared to other cities that are also densely populated, Chennai?s emission intensity per capita is considerably below the average. However, compared to other cities with similar economic output, the per capita emission intensity in Chennai is considerably higher than average, in particular in the residential buildings and industries sector. This type of emission footprint has made the city to invest in low emissions projects like Roof top solar (about 13% of municipal departments energy consumption comes from solar power), NMT infrastructure to reduce trips made by fossil-fuel powered vehicles, Segregated Waste Collection System (The city now has about 2/3rd of area under segregated collection system). All these efforts have had good dividends in the last 4-5 years. In spite of the per capita energy consumption growing from ~700 kWh/year to 1210 kWh/year, the emission footprint has come down from 2.9 t CO2e in 2015-16 to 2.7 t CO2e in 2018-19 due to low-carbon investments made by the city.

Air pollution: Chennai is ranked 320th globally based on an AQI average PM2.5 measurement of 34.6 ?g/m? in 2019. This figure reflects the improvement to the air quality in Chennai since 2017 when the average PM2.5 figure was 39.8 ?g/m?. The 2018 average was 43.2 ?g/m?. For seven months of the year, Chennai?s air quality is classed as being ?Moderate? according to the World Health Organization?s (WHO) guidelines. A further four month?s readings class it as being ?Unhealthy for Sensitive? groups and during January 2019 the quality was classed as ?Unhealthy?.  Modelled urban

average ambient PM2.5 concentration is 57.5 ? 16.8 ?g/m3 ? is above the national standard (40) and more than 5 times the WHO guideline (10). The modelled source contributions highlight transport (including on road dust), industries (including the coal-fired power plants), and open waste burning as the key air pollution sources in the urban areas.

Flooding. Chennai water bodies well exemplify the city?s problematic urbanization trajectory. The development of roads, houses, and industries over and in close proximity to lakes and rivers has on the one hand, compromised the city?s ability to meet its water needs, and on the other, exposed citizens to frequent flooding. Flooding risk has further been aggravated by solid waste and sewage dumping into water bodies. This paradoxical situation involving either too much or too little water, experts believe, results from a failure during planning to consider the water system holistically. Thus, in designing city SWDs, the focus, until recently, has been on the single purpose of alleviating the impact of floods, while ignoring the fact that drains can play equally important twin roles in a) directing water to drain into reservoirs so it can be stored for later use, and b) allowing it to filter into the ground to recharge depleting aquifers.

Following the devastating 2015 floods (that led to a loss in excess of $ 3 billion[3]) which was attributed to climate change, more attention is also being paid to restoring and protecting water bodies as a means to enhancing future supply ((as almost 30-40% of total water demand in Chennai is met by ground water), as any activity to enhance local storage has also led to a corresponding rise in ground water table in the adjoining areas). However, ecologically restoring waterways and water bodies is a complex solution that requires addressing a range of issues including solid waste and sewage disposal, and legal and illegal encroachments.

Heat island effect. Chennai has experienced the ?Urban Heat Island? effect due to increased concretization. A study conducted by researchers at Anna University?s Center for Climate Change and Adaptation identified pockets of the city that had high temperatures as a result. The study covered a period between 1991 ? 2008 and found that the intensity of heat islands had risen between 1-2 degrees over the time period.

Urban green spaces are fragmented, shrinking, and unequally distributed. Chennai already has the lowest green cover among all the metropolitan cities in the country and this ratio is worsening. In the 426 sq km GCC area, only 64.06 sq km (15 %) accounts for green cover as against the target of 33 % stipulated in National Forest Policy[4]. The Government of Tamil Nadu in its 'Vision 2023' has stated that the state aims to achieve a forest cover of 33%.

Urban planning has also been unsuccessful in tackling the city?s solid waste and sanitation issues effectively. Several experts across government and non-government agencies agree that mismanaged solid waste was one factor that contributed to major flooding in 2015, when waste choked SWD and waterways, causing large-scale inundation. In fact, in the aftermath of the floods, the GCC had to remove 1.32 million tonnes of garbage that was strewn across the city, which amounts to almost 25 days? worth of waste.

However, recent developments such as steps taken by the GCC to redefine solid waste management vendor contracts and to ban the manufacture, sale, and use of plastics indicate intent to tackle the issue

more seriously. A new waste management project has been started in about 7 zones of Chennai since 2020, that will collect segregated waste in the city. This has been met with mixed results due to lack of limited segregated processing capability after the collection, leading to mixed dumping.

Urban resilience / water Management.  Urban demand for water in Chennai has been increasing at an alarming rate due to increase in the intensification of construction water & domestic water use as a result of increased commercial & housing demand. The net result is that water resources are being overexploited throughout the region. Chennai's water demand is about 1,200 million litres per day (MLD) out of which only about 550 million liters is provided by Chennai Metro Water Supply & Sewerage Board (CMWSSB). This gap leads to a significant stress in the groundwater aquifers. Considering the fact that the biggest weather stress factor for Chennai is water, resilience building in Chennai includes a need for water conservation. Metering to measure consumption and effective pricing are the most direct ways to manage demand and encourage users to conserve water. However, the extent of water metering in Chennai today is less than 10%. This dearth of water meters not only makes consumption-based pricing impossible, but also has implications for another demand management technique: reducing non-revenue water (NRW) or water lost due to bad piping infrastructure, theft, and illegal water usage. On average, non-revenue water (NRW) accounts for around 20% of water produced in Chennai. Also, effective pricing is extremely difficult to implement in Indian households, as they are accustomed to paying extremely low tariffs for water and are averse to water metering and consumption-based pricing. Any small change in price thus requires public approval to avoid political costs associated with the changes. A pilot attempt to introduce metering in Anna Nagar in 2008 had to be abandoned for several reasons, including already existing water quality and water pressure related issues, logistical issues in fixing water meters, and political blow-back as a result of the substantially higher monthly water tariffs.

Another constraint to conserving fresh water is the poor monitoring and enforcement of restrictions on groundwater extraction by end-users, as result of which the city?s groundwater table has been depleting between 10 cm and 20 cm every year, approximately since 1980. The 1987 Chennai Metropolitan Area Groundwater (Regulation) Act obligates obtaining permission and licenses to sink wells, and to extract or use or transport groundwater. The rules do not apply to domestic users.

*Baseline for the Alternative Scenario*

The project will demonstrate an integrated approach to address the challenge of flooding in Chennai and issue of water shortage through sustainable management of existing water bodies using nature-based solutions (NbS).

The average annual rainfall is about 1,400 mm (55 in). The city gets most of its seasonal rainfall from the north-east monsoon winds, from mid-September to mid-December. Cyclones in the Bay of Bengal sometimes hit the city. Highest annual rainfall recorded is 2,570 mm in 2005. The most prevailing wind direction in Chennai is the south-westerly between the end of May to end of September and the north-easterly during the rest of the year.  Three rivers meander through Chennai, the Kosathalayar in the northern region, the Cooum River (or Koovam) in the central region and the Adyar River in the southern region. Several lakes of varying size are located on the western fringes of the city. Red Hills,

Sholavaram and Chembarambakkam Lake supply Chennai with potable water. Groundwater sources are mostly brackish.

Historically, Chennai has faced a problem of water supply shortages as no big river with treatable/drinkable water flows through it with a resulting over-reliance on annual monsoon rains to replenish water reservoirs. All the rivers are heavily polluted with effluents and trash from domestic and commercial sources. The city's ground water levels have been depleted to very low levels in many areas.

Chennai is within a climate zone that is prone to occurrence of tropical cyclones and heavy rains which frequently result in catastrophic flooding that causes heavy damages to people and infrastructure. These floods primarily occur during the Months October to December when Chennai is within the realm of the North East Monsoon. Catastrophic floods during 1943, 1976, 1985, 1996, 2005 and 2015 had caused heavy damages to infrastructure of the city and loss of lives.

The existing storm water drainage systems in these expanded areas are not able to cope with storm water especially during monsoon resulting in flooding of the area, which causes various adverse impacts on the inhabitants, business and environment.

For the Greater Chennai City Corporation, the implementation of an effective storm water system is a fundamental requirement for the improvement in hygiene, reduction of flood impacted areas and avoiding of physical obstructions during monsoon season.

The Watershed area in Chennai has four major water basins, namely, (i) Kosasthalaiyar, (ii) Cooum, (iii) Adyar, and (iv) Kovalam. GCC (GCC) is the responsible department/organization in maintaining the infrastructure for the stormwater disposal in the core and extended areas of Chennai. Additionally, GCC also maintains many water bodies within the municipal boundary limit.
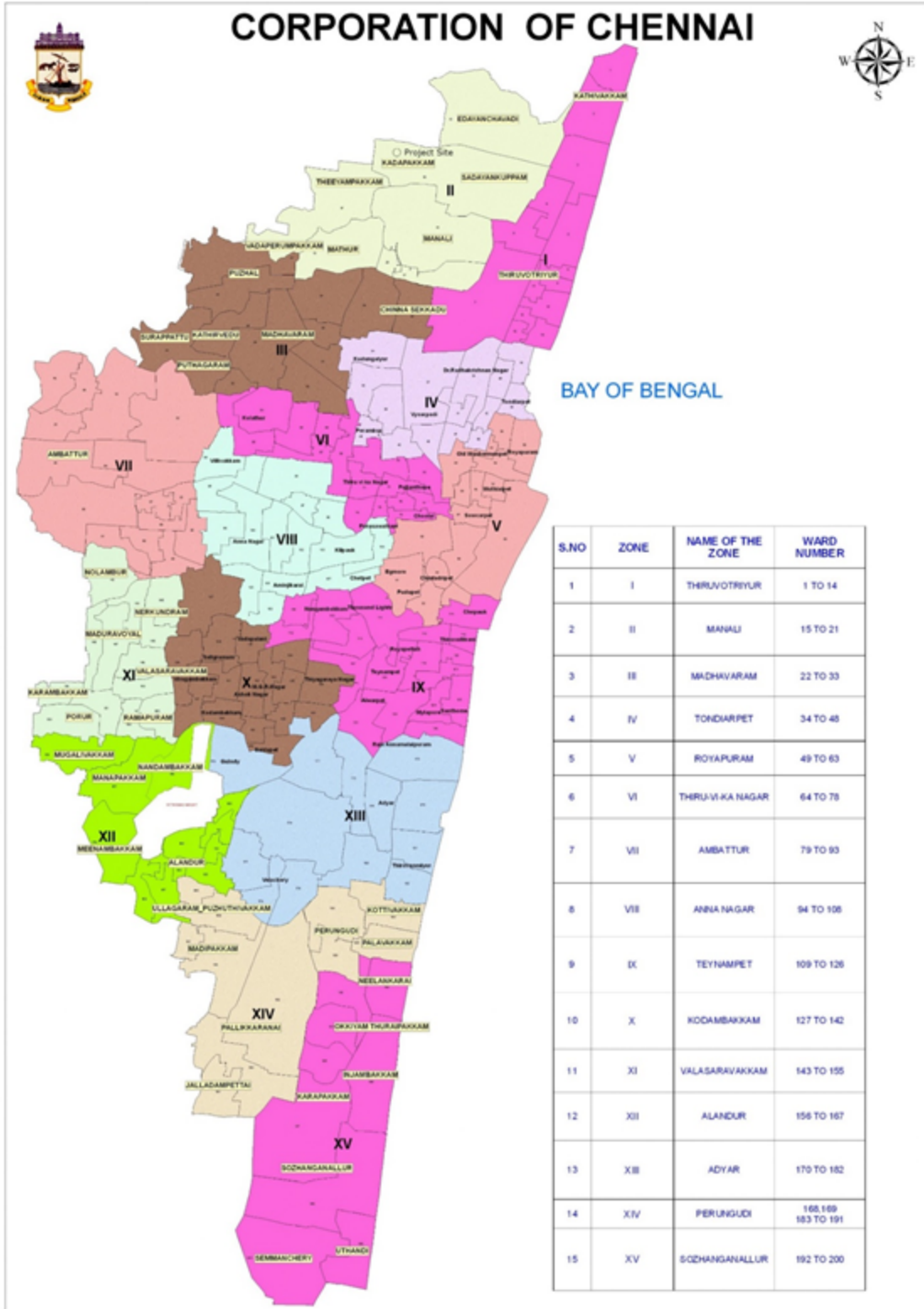
# CORPORATION OF CHENNAI

BAY OF BENGAL

| S.NO | ZONE | NAME OF THE ZONE | WARD NUMBER |
|------|------|------------------|-------------|
| 1 | I | THIRUVOTRIYUR | 1 TO 14 |
| 2 | II | MANALI | 15 TO 21 |
| 3 | III | MADHAVARAM | 22 TO 33 |
| 4 | IV | TONDIARPET | 34 TO 48 |
| 5 | V | ROYAPURAM | 49 TO 63 |
| 6 | VI | THIRU-VI-KA NAGAR | 64 TO 78 |
| 7 | VII | AMBATTUR | 79 TO 93 |
| 8 | VIII | ANNA NAGAR | 94 TO 108 |
| 9 | IX | TEYNAMPET | 109 TO 126 |
| 10 | X | KODAMBAKKAM | 127 TO 142 |
| 11 | XI | VALASARAVAKKAM | 143 TO 155 |
| 12 | XII | ALANDUR | 156 TO 167 |
| 13 | XIII | ADYAR | 170 TO 182 |
| 14 | XIV | PERUNGUDI | 168,169 183 TO 191 |
| 15 | XV | SOZHANGANALLUR | 192 TO 200 |

Figure 11: CHENNAI ZONE MAP

*Baseline projects*? Investments in River basin and Drainage Systems

Adyar and Cooum Basin. In Phase I, covering Zones 7, 11 & 12 in the Adyar and Cooum basin, the construction of integrated storm water drain (ISWD) and improvements to canals have been taken up under Tamil Nadu Sustainable Urban Development Project that was funded by the World Bank. This project involved constructing storm water drains for the length of 406 km at an estimated amount of US$ 168 million. The project directly benefited about 2.4 million citizens who live within the 2 km buffer area of these rivers. All works have been completed.

Kovalum Basin ISWD project for Kovalum  is taken up by funding from the German Development Bank (KfW) at the cost of US$ 165 million to a length of 360 km. This project directly will benefit about 1.8 million citizens who live in this sub-basin of Chennai. The project is expected to commence implementation in 2021.

Kosasthalaiyar River Basin is located in the northern part of Chennai, consisting of 127.80 sq. km covering GCC administrative zones 1, 2, 3, 7 & 8. The project area has eleven (11) sub-watersheds based on the topography and natural flow patterns. 170km of the existing stormwater drain is required to be rehabilitated due to inadequate hydraulic carrying capacity. A new drain for 588 km has been proposed. Necessary interlinking of water bodies through the existing or proposed drain has also been considered to maintain the water balance and achieve maximum water storage within the Kosasthalaiyar drainage basin. This project, funded jointly by ADB and GCC is scheduled for implementation in 2021. The total project investment is about US $ 470.5 million (ADB component about US $ 251 million) and is expected to directly reduce the flooding impact for 1.9 million citizens.

**Investments in canal restoration:** The rehabilitation works of 7 macro drains/surplus canals managed by the state Public Works Department (PWD) are also being considered part of an Integrated Urban Flood Management approach. In parallel to the ADB loan project, adopting the same flow model and designs, the PWD will implement the restoration of three macro drains/surplus canals in the basin, namely Retteri Surplus  (2.01km), Puzhal Surplus  (12.23km), and Thanikachalam Drain (3.62km). Under the project, GCC will implement rehabilitation of the remaining four macro drains/surplus canals (Ambattur Surplus, Korattur Surplus, Kadapakkam surplus,  and Ariyalur Surplus) with ADB funding. The eastern portion of the north Buckingham-Canal watershed is lower than the canal bed level. Hence an existing pumping station equipped with two 10 HP pumps having a capacity of 2833 LPM each and 3 m diameter sump was constructed by GCC near Kargil Nagar to pump the rainwater into Buckingham Canal during floods or on an as-required basis. An additional pumping station comprising three higher capacity pumps is proposed in Kargil Nagar due to the lower capacity and ageing pumps. A new stormwater pumping station has been proposed at Ernavoor to avoid flood inundation based on the  detailed analysis. All  of these  canal  improvements  will  be  part  of the Kosathalayar basin  restoration  project  that  will  be  funded by  ADB & GCC jointly and PWD separately. These improvements will create additional ability to handle peak runoff caused and exasperated by climate change by providing improved carrying capacity and higher pumping capacity.

**Investments in lake restoration:** GCC has taken up restoration of water bodies using a range of programs and collaborations. GCC identified 210 water bodies to be restored and rejuvenated; out of

the 210 water bodies, restoration of 9 water bodies has been completed under annual budget, discretionary member of legislative assembly fund (MLA fund). Restoration of 63 water bodies is taken up under smart city funds, and rejuvenation of 64 water bodies are taken up under Corporate Social Responsibility (CSR) fund. Restoration of 49 ponds at the cost of US $ 24 million will additionally be taken up under the Chennai Mega City Development Mission (CMCDM) fund that was specifically created for assisting in urban infrastructure and basic services projects by the Government of Tamil Nadu.

The GCC also engages with the private sector through the Corporate Social Responsibility (CSR) Scheme to restore selected water bodies. The GCC along with Chennai Smart City Limited (CSCL) has instituted the ?Chennai Water Restoration Framework?. This framework allows for distinct roles for the various stakeholders and outlines the roles and responsibilities for the related stakeholders (like owner, technical restorer, funder, operations & maintenance, public oversight). The framework allows for funding of water bodies to be taken up by private individuals and institutions. Many water bodies in Chennai have been taken up for restoration under this scheme. Companies and business associations including the Confederation of Indian Industries (CII), Cognizant Technology Solutions, Wipro etc. have funded the restoration of many water bodies in the city.

Most of the lake restorations undertaken in Chennai city are material intensive. Though part of this type of restoration is due to soil conditions, some organizations like the Environmentalist Foundation of India and The Nature Conservancy Trust (TNC) have worked on nature-based conservation techniques. However, this methodology has not been mainstreamed nor widely adopted in the region.

International linkages

GCC has also leveraged the approaches, initiatives, projects, and tools created by global organizations to support cities to become more sustainable and be able to respond to sustainability challenges. Some of those key initiatives working at the intersection of climate change mitigation, political leadership, capacity building, urban planning, nature-based solutions and gender equality are:

The Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC). The World Resources Institute, C40 Cities and ICLEI have partnered to create a GHG Protocol standard for cities known as Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC). The GPC seeks to help cities develop a comprehensive and robust greenhouse gas inventory to support climate action planning and help cities establish a base year emissions inventory, set reduction targets, and track their performance. C40 Cities assisted the city in creating the first GPC compliant GHG inventory for the year 2015-16. This has now been subsequently revised to 2017-18. The city publicly shares its GHG data with the Carbon Disclosure Project (CDP) platform annually.

Deadline 2020. Deadline 2020 is a commitment led by C40 cities but open to non-C40 cities as well, to urgently deliver highly ambitious and equitable climate action. Cities that join the Deadline 2020 commitment need to develop and begin implementation of inclusive climate action plans by the end of 2020, in order to deliver on the highest ambitions of the Paris Agreement ? to limit global temperature rise to 1.5 degrees Celsius. These science-based climate action plans are putting cities on the path to reduce greenhouse gas emissions and become emissions neutral by 2050. They will also make cities

more resilient to the impacts of climate change, and create social, environmental and economic benefits for all citizens. Chennai has already committed to the Deadline 2020.

100 Resilient Cities (100 RC): In 2013, The Rockefeller Foundation pioneered 100 Resilient Cities to help more cities build resilience to the physical, social, and economic challenges that are a growing part of the 21st century. Cities in the 100RC network have been provided with the resources necessary to develop a roadmap to resilience. GCC appointed a Chief Resilience Officer for the city in 2017. Subsequently a high-level resilience analysis for Chennai was commenced to understand the GAPS in both technical as-well-as the Governance side. The Chennai Resilience Strategy identified 86 actions across 5 thematic pillars namely, i) Healthy & Planned Urbanization ii) Water Systems iii) Disaster Preparedness iv) Governance Ecosystem and (v) Vulnerable Communities.

International Network of Michelin Cities (INMC): The International Network of Michelin Cities was launched in 2014. The aim of this network is to develop public and private partnerships between around fifty cities all over the world sharing the common feature of being home to a Michelin production or research center, as well as their partner cities.

| Project and funder | Description | Duration | Relevance for project | Budget |
|---|---|---|---|---|
| Kovalum Basin to be funded by KfW & Government of Tamil Nadu | ISWD project for Kovalam is taken up by funding from the the German Development Bank (KfW) at the cost of US$ 165 million to a length of 360 km. This project directly will benefit about 1.8 million citizens who live in this sub-basin of Chennai. The project is expected to commence implementation in 2021. | 48 months | Improve adaptation to climate change in the southern part of the city.<br><br>Increased cross learning with the project for NbS. | US$ 165 million |
| Chennai Mega City Development Mission (CMCDM) | Restoration of 49 ponds at the cost of US $ 24 million. The fund is specifically created for assisting in urban infrastructure and basic services projects by the Government of Tamil Nadu. | 24 months | Disaster risk reduction by improving localised storage of water<br><br>Increased cross learning with the project for Nature based lake restoration. | US $ 24 million |

| | | | | |
|---|---|---|---|---|
| Smart Cities Mission Fund | Restoration of 63 water bodies taken up under the Smart Cities Mission. | 36 months | Disaster risk reduction by improving localised storage of water<br><br>Increased cross learning with the project for Nature based lake restoration. | US $ 35 million |
| Member of Legislative Assembly Fund | Restoration of 9 water bodies taken up under the discretionary funding of the legislative members. | 18 months | Improved cross-learning by improving and informing subsequent lake restorations with NbS. | US $ 4 million |
| Kosasthalaiyar River Basin funded by ADB & Government of Tamil Nadu | The project area has eleven (11) sub-watersheds based on the topography and natural flow patterns. 170km of the existing stormwater drain is required to be rehabilitated due to inadequate hydraulic carrying capacity. A new drain for 588 km has been proposed. Necessary interlinking of water bodies through the existing or proposed drain has also been considered to maintain the water balance and achieve maximum water storage within the Kosasthalaiyar drainage basin. This project, funded jointly by ADB and GCC is scheduled for implementation in 2021. | 48 months | Improved cross-learning by improving and informing subsequent lake restorations with NbS. | US $ 472 million |

| Integrated Cooum River Eco-Restoration Plan | The Project presently covers the Cooum restoration between the stretch from Paruthipattu to the river mouth in the Bay of Bengal. | 60 months | Improved cross-learning by improving and informing subsequent lake restorations with NbS. | US $ 80 million |
|---|---|---|---|---|

## I.2. Pune

Pune is the seventh-most populous city in India, second largest in the state of Maharashtra and the second biggest software hub in the country. Pune city is spread across 331.26 sq. km. and as per 2011 census, the city is home to 3.11 million population.

The city?s growth is attributed to several economic engines such as knowledge economy, auto & manufacturing, IT and IT enabled services (ITES), and proximity to Mumbai & the western coastline. As per Brookings institute?s 2014 ranking, Pune has the 7th highest GDP among Indian cities, making it one of the most important urban economies in the country. Pune was adjudged second best on the Ease of Living (2020), 5th on Municipal Performance Index (2020), and 15th under Swachh Survekshan (2020).

Pune is often referred to as Oxford of the East as it has 9 universities and over 100 higher education facilities. As per census 2011, jobs offered by the knowledge economy in the area have attracted and retained a highly skilled and young workforce of about 33% of the city's population. It is also one of the successful start-up destinations, housing more than 400 local start-ups. Another important area of concern is the low female workforce participation which at 16.8% for urban Maharashtra raises questions on the employment pathways being promoted. Furthermore, most of these women are involved in the informal sector and/or underpaid care-related services like health and education (IWWAGE, 2020). This is not surprising as in spite of a high intensity of educational institutes in the city, only 61% of women aged 15 to 49 years in the district had completed 10 or more years of schooling (NFHS-5). Pune district also witnessed a significant decline from 927 to 873 (women per 1000 men) in terms of sex ratio at birth for children, and around 24% of child marriage prevalence rate, pointing to high levels of gender discrimination existing in the society (NFHS-5).
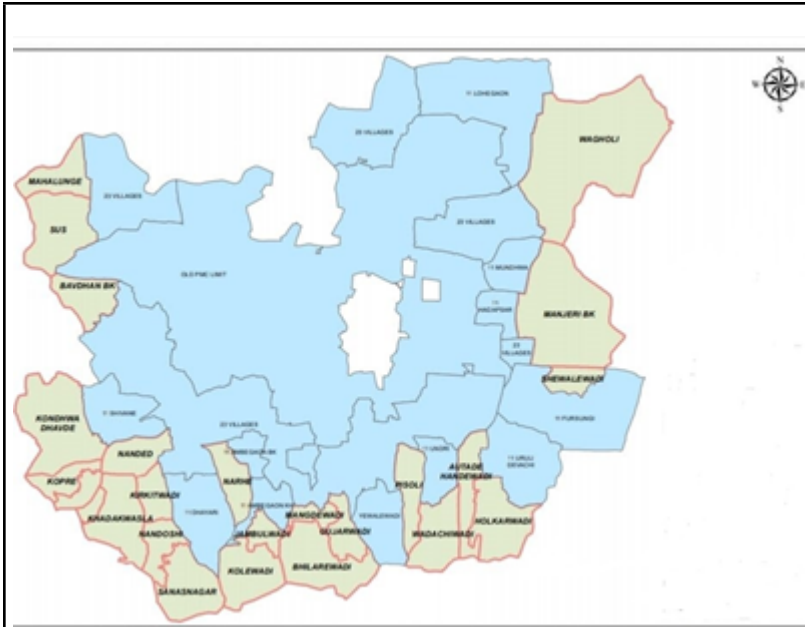
**Pune (Pune Municipal Corporation)**

Population: 3,132,143 (2011, Census)

Key economic industries: IT, Education

Province: Maharashtra

Part of metropolitan area: Pune Metropolitan Region

Area: City = 518 km2, municipality = 331.26 km2

Key sustainability challenges: Urban sprawl and its impact on transport, Air quality, waste and depleting green cover.

Greenhouse gas emissions 1.46 tCO2e emissions per capita (2010-2011, Teri study on Carbon inventory of Pune city)

Integrated planning platform exists? No. (https://pmc.gov.in/mr does not provide such services).

Key strategic plans:

Draft City Development Plan (CDP), 2041.

Pune Clean Air action Plan 2019 (Approved)

Pune Resilience strategy 2019 (approved)

Pune city Comprehensive Mobility Plan 2008

Comprehensive Mobility Plan (CMP), 2018

Key institutional actors:

Pune Municipal Corporation (PMC)

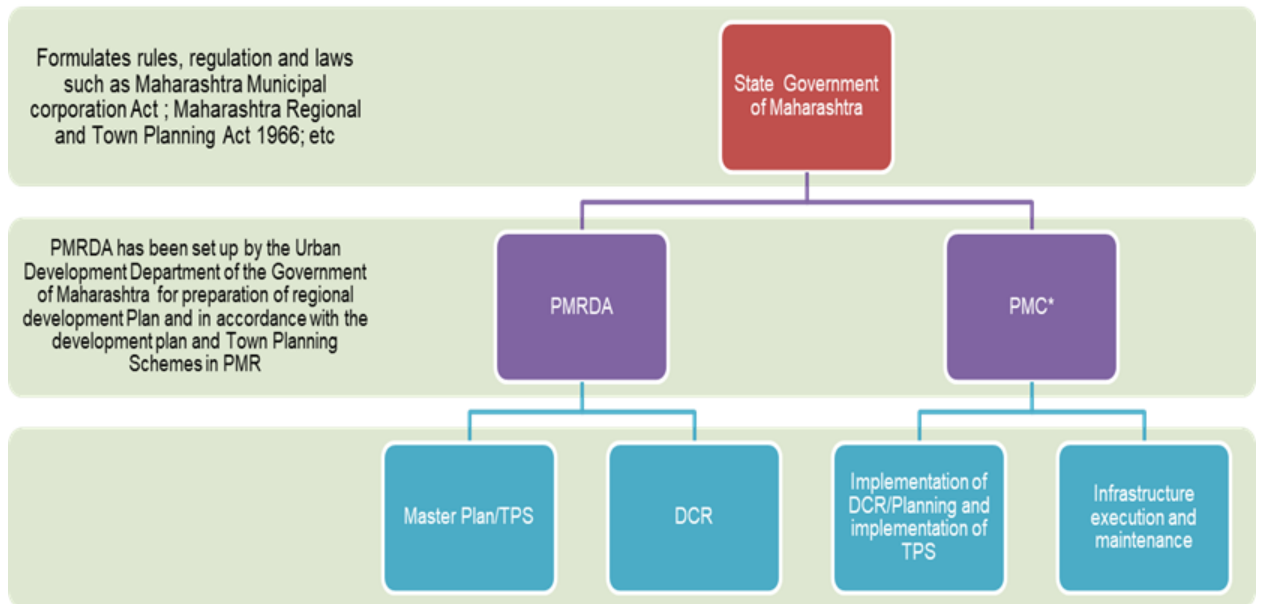Pune Metropolitan Region Development Authority (PMRDA)

*Key institutional arrangements on urban planning and key planning instruments*

The Pune Metropolitan Region (PMR) comprises two municipal corporations namely Pune Municipal corporation (PMC) and Pimpri Chinchwad Municipal corporation (PCMC), 3 cantonment boards, 7 Municipal councils, 842 villages and 13 towns.

The state government is responsible for formulating rules, regulation and laws (e.g., Maharashtra Municipal corporation Act; Maharashtra Regional and Town Planning Act 1966, etc.) that guide the urban development and broadly defines the mandates for urban local bodies.

PMRDA established in 2015 by the Urban Development Department of the Government of Maharashtra, is responsible for preparation of regional development plan, TPSs, and establish development control regulations that governs the land use in Pune Metropolitan Region (PMR). PMC is responsible for execution of development control regulations, Town Planning Schemes, infrastructure/ Service delivery and maintenance of the services. PMC is responsible for the following functions:

- Regulation of land use and construction of land buildings.
- Urban planning including the town planning.
- Planning for economic and social development
- Urban poverty alleviation
- Water supply for domestic, industrial, and commercial purposes
- Fire services
- Public health sanitation, conservancy, and solid waste management
- Slum improvement and up-gradation
- Safeguarding the interests of the weaker sections of society, including the physically handicapped and mentally unsound
- Urban forestry, protection of environment and promotion of ecological aspects
- Construction of roads and bridges
- Provision of urban amenities and facilities such as parks, gardens and playgrounds
- Promotion of cultural, educational and aesthetic aspects
- Burials and burials grounds, cremation and cremation grounds and electric crematoriums
- Cattle ponds, prevention of cruelty to animals
- Regulation of slaughterhouses and tanneries
- Public amenities including street lighting, parking spaces, bus stops and public conveniences
- Vital statistics including registration of births and deaths

Formulates rules, regulation and laws such as Maharashtra Municipal corporation Act ; Maharashtra Regional and Town Planning Act 1966; etc

State Government of Maharashtra

PMRDA has been set up by the Urban Development Department of the Government of Maharashtra for preparation of regional development Plan and in accordance with the development plan and Town Planning Schemes in PMR

PMRDA

PMC*

Master Plan/TPS

DCR

Implementation of DCR/Planning and implementation of TPS

Infrastructure execution and maintenance

The existing institutional framework does not clearly define the roles and responsibilities between state governments, parastatals like Water Supply and Sewerage Boards, Urban Development Authorities, Metropolitan Planning Committees, and urban local bodies regarding planning and implementation.

| Government Body | Jurisdiction | Accountability | Tax/user charge collection | Water Supply, Sewage, SWM and SWD | Housing and Slums | Transport | Roads | Urban Planning, Development Control |
|---|---|---|---|---|---|---|---|---|
| PMC | Pune City area | Citizens of Corporation | ■ | ■ | ■ | ■ | ■ | ■ |
| PMRDA | Metropolitan Area | State Government | | | | | | ■ |
| Maharashtra Industrial Development Corporation | Entire State | State Government | | ■ | | | | |

| Agency | Jurisdiction | Ownership | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pune Mahanagar Parivahan Mahamandal Limited (PMPML) | Pune and Pimpri-Chinchwad Area | PMC and PCMC | | | | 🟦 | | | | |
| Maharashtra Metro Rail Corporation Limited (MMRCL) | Entire State | State Government | | | | 🟦 | | | | |
| Irrigation Department | Entire State | State Government | | 🟦 | 🟦 | | | | | |
| Pune Housing and Area Development Board | Pune and surrounding 4 districts | State Government | | | 🟦 | | | | | |
| Pune Traffic Police | Pune City | State Government | 🟩 | | | 🟦 | | | | |
| Maharashtra Jal Board | Entire State | State Government | | 🟦 | | | | | | |
| | 🟨 | Key agency in respective jurisdiction | | | | | | | | |
| | 🟦 | Overlap | | | | | | | | |
| | 🟩 | Coordination | | | | | | | | |

The Transport infrastructure responsibility in the PMC limits is divided between PMC departments and the State government entities. The PMC Road department is responsible for constructing and maintaining of all the roads and bridges that fall within the PMC limits as well as the streets and NMT infrastructure within the TPS areas. The Cycle Department is a newly formed department tasked with implementing the Pune Cycle Plan and has the responsibility for developing the cycling pathways within PMC limits. The PMPML is the public transport bus service provider for the twin cities of PMC areas and the other areas within the Pune Metropolitan Region. This is a special purpose vehicle jointly owned by PMC and PCMC. The Pune Metro infrastructure in PMC areas is being developed MMRCL which is jointly owned SPV of Government of India and Government of Maharashtra. The Regional Transport Authority (RTO) is responsible for vehicle registration and maintenance of these records as well as fitness certificates for vehicles.

*Data Governance*

PMC collects processes and generates a large amount of data in its day-to-day functioning. As per the Digital strategy document 2018, Pune city is aspiring to become digital city and envisions to achieve a smart digital future and aims to leverage newer technologies to improve internal efficiencies. The available digital strategy document discusses four pillars as set for digital transformation of the city namely:

? Digital infrastructure-To provide state of the art digital infrastructure to facilitate seamless digital experience.

? Digital services and payments-To re-engineer business processes to simplify civic services and to facilitate digital payments through cashless ecosystems/channels.

? Digital engagement and collaboration-To use various communication and engagement channels effectively to communicate with local communities and gauge the community sentiments over these platforms.

? Digital Enterprise-To increase the internal efficiencies of local civic bodies and to make better policy-making decisions by utilizing improved data analytics.

The existing platform of ICCC is collecting information pertaining to Traffic movement, CCTV?s footage of installed cameras across the city, hospital bed availability data and COVID positive cases tracking of the city. Currently PMC and  Pune Smart City Development Corporation Ltd  (PSCDCL) are the only department?s having access to the collected data through ICCC and they are in process of integrating data for other services.

Government data remains inaccessible to citizens, civil society, although most of such data may be non-sensitive in nature and could be used by the public for social, economic, and developmental purposes. PMC has taken various steps towards making data available through open source such as Open Data Store as launched in 2016, revamped PMC official portal, PMC Care app etc. following National open data governance policy.

*Urban Finance*

PMC funds its operations through a combination of own sources (property tax and Local Body Tax), grants from state governments and funds from central government for centrally sponsored schemes such as JNNURM, Smart Cities, AMRUT etc. A jet siyrce if revenue was Octroi, which post implementation of GSThas been aboloished resulting in loss of almost 35% of its revenue. This is compensated by the State Government based on its share of GST received from the center.

**Municipal Revenue (Rs Crore)**

- Local Bodies Tax
- Octroi Compensation
- Property Tax
- Water Tax
- Subsidy from Government
- Other Income
- Loan and Municipal Bonds
- PMAY

300 — 5%
185 — 3%
170.57 — 3%
876.21 — 13%
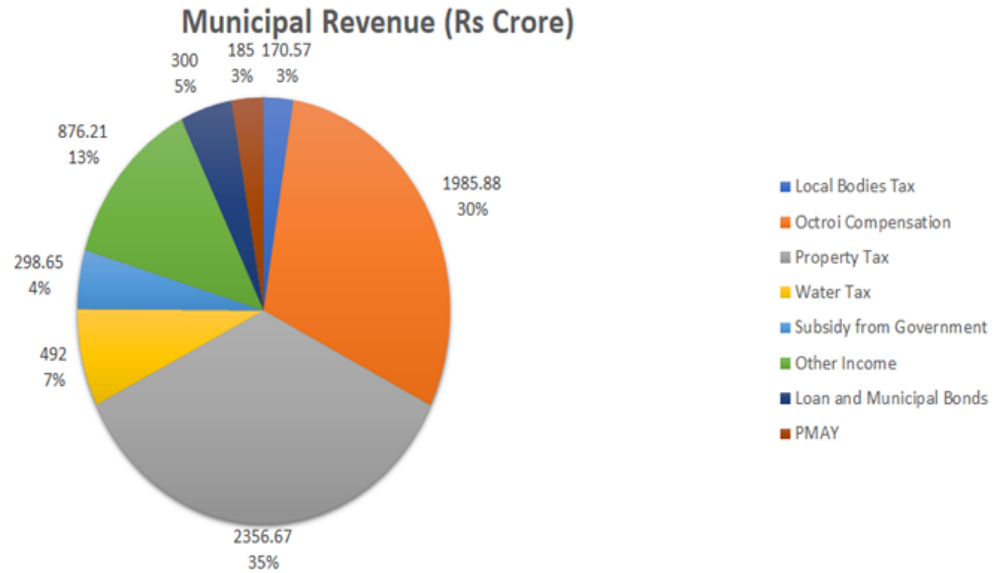298.65 — 4%
492 — 7%
1985.88 — 30%
2356.67 — 35%

Figure 12: PMC Budget 2021-22[5]

The City Development Plan prepared by PMC has estimated a total investment of Rs 88443.9 crores (~ 12 billion USD) including the Special Projects to meet the various objectives in the plan. The PMC has had revenue surplus (revenue generated ? revenue expenditure) around 2500 crore (~0.34 billion) in 2019. This limits the capacity of city to raise loans to implement the projects, as cities by law are prevented from deficit financing, thus the loan raising capacity is constrained by the capacity to pay interest and principal through the revenue surplus. There is a lack of private sector financing as cities have limited capacities to develop PPPable and bankable projects. The outlay for FY 2021 is INR 7650 Cr. Or USD 1.12 Bn. Out of which only 5% of the total budget is allocated to PPP projects and a meager budget of 0.006% is set aside for EV charging infrastructure. In January 2021, Pune Municipal Corporation proposed to hike property tax by 11%. As per proposal, the hike will be 5.5% in general tax, 3.5% in cleanliness tax and 2% in the water tax, in addition to a 5 % increase in water charges. Pune is also one of the very few municipal corporations in India to have adopted participatory budgeting as well as women?s budgeting. This provides a huge opportunity for citizens participation in the governance process.

*Baseline*

A key sustainable urban challenge that Pune faces is the urban sprawl. PMC has grown in the pattern of concentric rings and is witnessing a high-density development, with the city recording 40,000 people per sq. km. Such a rapid rise in population density is enormous, especially, when compared to similarly sized cities in India. However, the city has begun sprawling to its peripheries at a density of 9,000 people per sq. km. The key sustainable urban challenge that Pune faces is due to mismatch in urbanization accompanied by planned infrastructure development and service expansion causing poor service delivery, especially in peri-urban areas. Spontaneous urban development on the fringes of Pune is resource intensive, unsustainable, poorly governed, has little consideration of sustainability of the

ecosystem services and is contributing to other major issues such as deteriorating air quality, health of water bodies, surface temperature increase, etc.

Figure 13 shows that the urbanization between 2000 to 2015 took place mainly in peripheral areas. Of the total built up growth, 48.27% of the growth was in the peripheral areas.
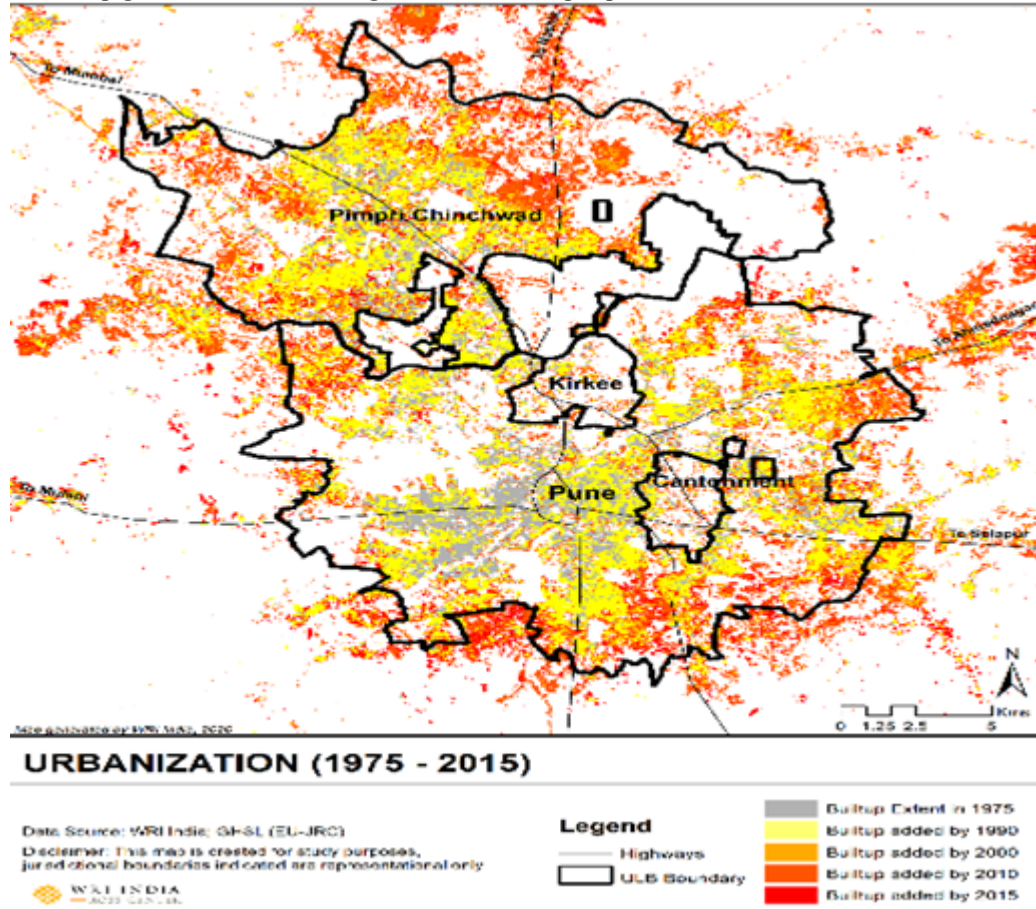


Figure 13: Pune urban sprawl over the years

Additionally, the vegetation change and surface temperature change maps of the region (Figure 14), show the greatest change of intensity in peripheral areas. This urban sprawl has resulted in conversion of green spaces, and degradation of water bodies. While unprecedented urban sprawl is the key source of environmental and urban development pressures, the city does not have an integrated urban plan for managing the sectoral interventions. The lack of clear mandate and coordination on addressing environmental issues too has contributed to it. For instance, in Pune, the state government oversees city forests/hill areas, whereas, PMC oversees lakes, even though both may be part of the same watershed.
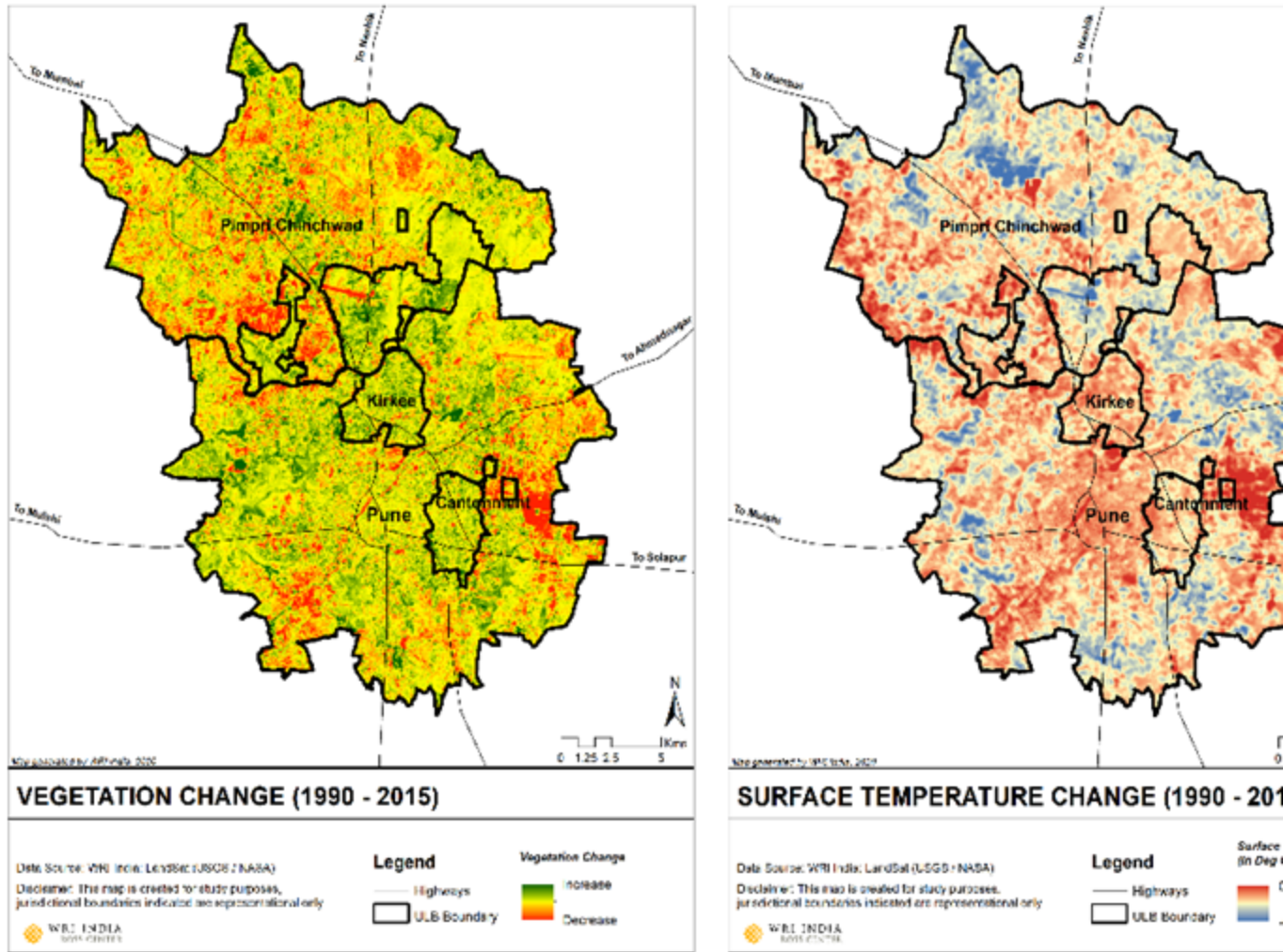
Figure 14: Pune change in vegetation cover and temperature

Urban sprawl has resulted in, both, an increased share of longer trips and average trip length. The average trip length has increased to 10 kms and 48% of trips are longer than 5 km. In absence of efficient public transit options, the use of personal vehicles to meet travel demand has increased. Public transport caters to about 20% of the city's population. Furthermore, public transport is currently not effectively integrated with non-motorized transport, leading to difficulty in accessing public transport networks for those without cars. This lack of adequate and safe public transportation often becomes a major hindrance for mobility of women and girls affecting both their employment and education options.

Congestion is leading to lost economic activity due to increased trip length time, increasing share of GHG emissions and increase in air pollution levels. Pune?s air pollution has increased by 35.7% since 2010, as per the Indian Institute for Meteorology (IITM). In Pune, PM 2.5 is at ~56 ug/m3, which is higher than the national average of 40 and 5 times higher than the WHO guideline of 10. PM 10 levels are higher in the fringe areas due to higher construction activities. Fig 13 below shows that about 50% of PM2.5 load is from the transport sector.[6]
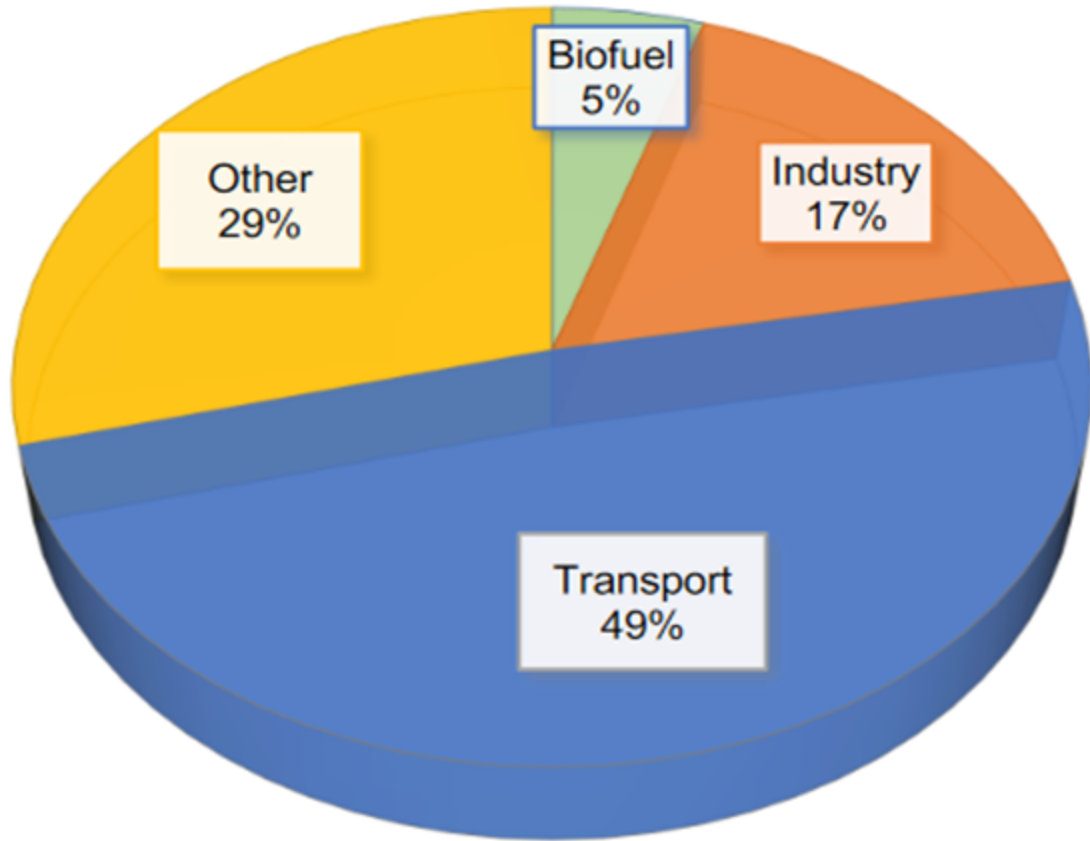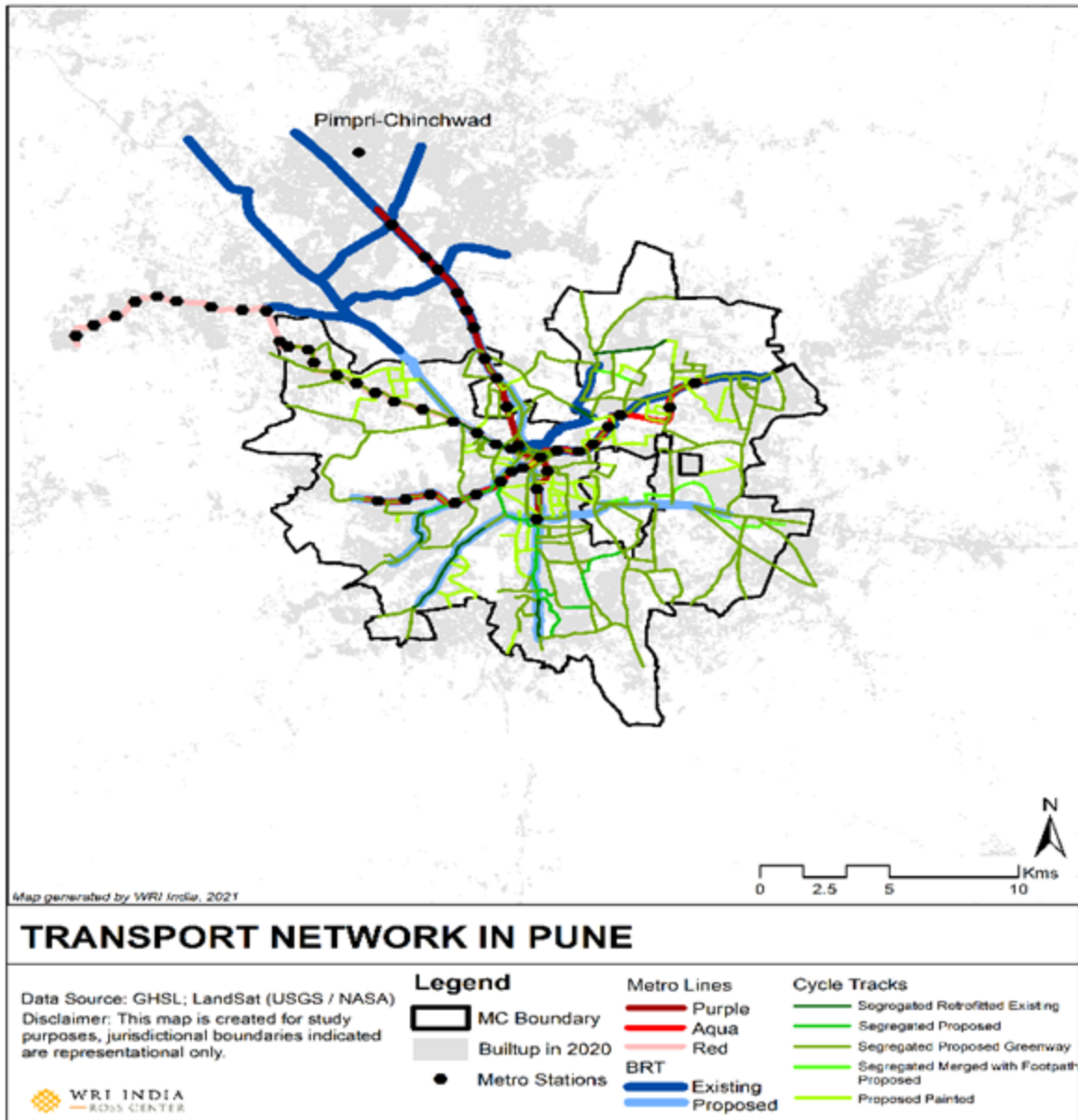
Figure 15: CONTRIBUTION TO PM2.5 EMISSION LOAD IN PUNE

To address the issue of congestion and ease of travel arising due the issue of urban sprawl as well to address air pollution, Pune introduced India?s first bus rapid transit system (BRTS, sometimes also referred to as BRT) in 2005, followed by Rainbow BRTS in 2015 and then introduction of MRTS system in 2016 within the city. This was still focused on providing increased supply of public transport and didn?t address the issue of sprawling of city due to in-adequate planning approach. The consideration of MRTS and BRTS routes and takes the existing city design as a basis for planning the routes. It doesn?t consider this as a tool for address urban sprawl. Additionally, the city government is focusing on increasing the NMT infrastructure, and EVs to address the issue of air pollution. This doesn?t consider addressing the issue of increased demand for transportation, which is a big contributor to the air pollution.

Pune is one of the 100 cities covered under the National Smart City Mission (See section 7 for details on Smart City Mission). The city has identified a number of projects, both, covering whole of the city (pan city) and area based projects to improve the livability of city through technological solutions. Some of the key pan city projects are ? introduction of EV buses for public transport, smart street lighting, smart meters, intelligent road management systems through IT based networks, etc. Similarly, a number of area-based projects are being implemented including NMT, e-rickshaws, rainwater harvesting, smart parking, etc. A key element of the smart city project is the integrated command and control center (ICCC) to collect information and data for managing the city operations.

**TRANSPORT NETWORK IN PUNE**

Data Source: GHSL; LandSat (USGS / NASA)
Disclaimer: This map is created for study purposes, jurisdictional boundaries indicated are representational only.

WRI INDIA
— ROSS CENTER

**Legend**

| | |
|---|---|
| ☐ | MC Boundary |
| ▨ | Builtup in 2020 |
| ● | Metro Stations |

**Metro Lines**
— Purple
— Aqua
— Red

**BRT**
— Existing
— Proposed

**Cycle Tracks**
— Segregated Retrofitted Existing
— Segregated Proposed
— Segregated Proposed Greenway
— Segregated Merged with Footpath Proposed
— Proposed Painted

To address the issue of urban sprawl Pune city adopted the Maharashtra state Transit Oriented Development policy for facilitating better Land use and transport integration. TOD regulations were sanctioned and inserted in the Development Control and Promotion Regulations (DCPR) of Pune Municipal Corporation vide Govt. Notification dated 05/01/2017 followed by an amendment in 2019. As per the 2019 notification the PMC[7] is responsible to ensure execution of complete street design for the success of TOD and enable construction of street-oriented buildings while achieving optimum densities in residential, commercial and office buildings. As per the notification, the civic body has to carry out the impact assessment of the policy before granting building permissions. The policy will be applicable within the 500 m radius of about 62 major metro stations, High-Capacity Mass Transit Route (HCMTR) and Bus Rapid Transit System (BRTS). The TOD regulations require undertaking impact assessment of impact on infrastructure and amenities as well as traffic and environment. The

authorities are also required to use the impact assessment to develop an implementation plan to address any adverse impacts. The Planning authority is also expected to ensure complete pedestrianisation in the TOD zones for easy movement of the pedestrians to & from station within a period of one year from publication of this regulation. In absence of capacities to do so, the city authorities have been unable to develop a comprehensive integrated action plan for the station areas on TOD corridors. Lack of capacities as well as detailed TOD rules have made it challenging for the PMC to develop Comprehensive TOD plans to facilitate the implementation in absence of this the focus has only been on generating revenue by selling FSI and full implementation of TOD has not been initiated.

The Metro is planned and developed by MMRCL and BRTS is planned and developed by PMC in cooperation PCMC and operated by PMPDL, whereas the responsibility of planning and operationalizing TOD areas is with PMC within its jurisdiction. To effectively use and implement the TOD policy coordination between the various government entities is needed for planning that enhances the impact of public transport infrastructure and TOD areas. Presently such a coordination is neither recognized nor exists. This is important to ensure success to the efforts on for land use intensification and bringing mixed use around Public Transport corridors and separately on Low emissions mobility through EV initiative, greening of transit corridors and enhancing NMT networks. A coordinated development will ensure viability of the public transport through enhanced ridership and better livability for the population in TOD area areas.

The Maharashtra Government has adopted EV policy which targets to increase the share of registered EV vehicles to 10% by 2025. Pune city is also procuring EV buses and plans to increase the total EV bus fleet to 500 by 2030. PMC also recently approved a plan for e-bike sharing scheme and to establish 500 charging stations across the town to facilitate the implementation of state governments EV policy. The key challenge is that Pune doesn?t have any strategy or plan to make the city EV ready, especially in terms of development of charging infrastructure to facilitate the purchase and use of EVs. As the EVs are a new technology, the existing planning processes don?t include provisions of integrating the land requirement of creating EV charging infrastructure.

A key challenge at the city level is the issue of revenue generation for investments. This would be important both to create green NMT and EV infrastructure as well as improving the viability of MRTS and BRTS systems while keep fares at reasonable level. PMC sees sale of increased FSI as a key source of income which is not sustainable. There is no strategy to increase the amount of revenue through alternative sources of Land Value Capture (LVC) that would be more sustainable. There is no clarity on how the generated revenue is utilized or is getting re-invested in the TOD areas from where it is generated i.e., the revenues are not ring-fenced. There is a lack of innovation in business models for deploying Nature based solutions (NBS) alongside clean mobility/ Low emissions transport projects or infrastructure and/or integrated solutions consisting of NBS, NMT, EV, etc. as one project.

Pune aspires to be the digital city with state-of-the-Art facilities to leverage newer technologies for internal improvement. PMC collects processes and generates a large amount of data in its day-to-day functioning. But a large quantum of government data remains inaccessible to citizens, civil society,

although most of such data may be non-sensitive in nature and could be used by the public for social, economic, and developmental purposes. PMC has taken various steps towards making data available through open source such as Open Data Store as launched in 2016, revamped PMC official portal, PMC Care app etc. following National open data governance policy.

Though a number of steps have been taken by Pune to make data available challenges remain. One of the issues is multiplicity of data portals coupled with skewed updates. For example, majority data on PMC?s open data store portal has not been updated since 2017 and in some cases since 2018. Besides showcasing outdated information, the same has not been integrated with the established Integrated Command and Control Centre (ICCC). Therefore, despite the availability of such a large amount of data with different agencies, not much of it is used to draw insights and create actionable intelligence for city governance.

Pune Municipal Corporation in collaboration with the PSCDCL is taking steps to integrate the information through Integrated Command and Control Centre (ICCC), established as part of the National Smart Cities Mission. The existing platform of ICCC is collecting information pertaining to Traffic movement, CCTV?s footage of the city. However, it does not have a spatial data infrastructure that integrates geographic information and datasets on areas related to urban expansion (such as densities; built-up, public spaces etc.), physical and social infrastructure, energy (extent, usage, defaulters etc.), waste (collection extent, burning, processing etc.), transport (except traffic circulation), parking and biodiversity. Furthermore, most of the parameters are infrastructure related and do not take in account specific human development assets and services like child-care centers (AWC) schools, hospitals, public toilets, bus-routes, etc. which are important concerns for women and children.

There is currently lack of information on this data base for population density along the MRTS and BRTS corridors, green and grey infrastructure, such as green spaces, NMT, residential and commercial areas, etc. Such data could help plan the TOD areas better to enhance the accessibility of public transport systems, capacity of land value capture, and to enable equitable and inclusive growth. Without this information, the urban local bodies undertake a more sectoral and limited planning approach, as they are unable to visualize the interconnectivity of their urban issues.

Additional layers of information not yet integrated with ICCC are the natural ecosystems, such as forests, water bodies, river and flood plain area, etc. Availability of such data and its integration with planning can provide for better management of these resources through development of the public transit corridors in a way that pressure on these areas is reduced. Limited efforts in collecting, analyzing and using data to make decisions, has attributed to poor coordination among agencies while hesitance to make information public through open data portal has led to limited participation of private and civil society actors for arriving at need-based solutions.

*Interlinkages with ongoing other similar initiatives*

Pune city has also leveraged initiatives, technical support and tools created by global and Indian organizations to support cities to become more sustainable and be able to respond to sustainability challenges. Some of those key initiatives working at the intersection of climate change mitigation, political leadership, capacity building, urban planning, nature-based solutions and gender equality are:

India GHG program. The India GHG Program led by WRI India, Confederation of India Industry (CII) and The Energy and Resources Institute (TERI) is an industry-led voluntary framework to measure and manage greenhouse gas emissions. The programme builds comprehensive measurement and management strategies to reduce emissions and drive more profitable, competitive and sustainable businesses and organisations in India. In 2012, TERI assisted the first city to document a detailed carbon emission inventory at the municipal level. The city publicly shares this report, however, an update to the inventory is yet to be undertaken.

100 Resilient Cities (100 RC): PMC appointed a Chief Resilience Officer and subsequently resilience analysis for Pune was undertaken and a Resilience Strategy was prepared. The resilient strategy was proposed around three pillars namely growth, environment and economy.

Table 3: RELEVANT URBAN DEVELOPMENT PROJECTS

| Project and funder | Description | Duration | Relevance for project | Budget |
|---|---|---|---|---|
| Pune Metro Rail | Metro rail development for strengthening Public transport provision in the city and region | 2009 till 2023 | Integrating the TOD planning approach and convene other initiatives around EV, NMT, green buildings and Urban green spaces deliver integrated development project. | US$2.8 billion |
| Pune city NMT Plan implementation | Pune strives to be a cycle friendly city with 824-km-long long cycle way. | - | To improve and give impetus to cycling infrastructure in the city | USD 4.77 billion |
| EV buses | The PMC plans to prepare a city EV readiness plan and set up a city EV Fund to provide incentives for those purchasing EV and creating infrastructure in Pune. As a first step, under Faster Adoption and Manufacturing of EV (FAME) scheme, the city is procuring total of 600 EV buses. | - | For transitioning to Clean fuel/ Electric vehicles for GHG reduction | USD 9.41 Billion |

## 1.3. Surat

Surat is the 9th largest city by population in India, second fastest growing city in India with a population 6.6 million (SMC estimates for 2019). Surat has the highest % of migrant population in India with more than 50% migrant residents. The city population has grown tenfold in the last four decades. Surat has practically zero % unemployment rate and is a hotspot for jobs due to the rapid development of various industries in and around the city. Surat was awarded ?best city? by the Annual Survey of India?s City-Systems (ASICS) in 2013. Table below provides some key statistics for the city.
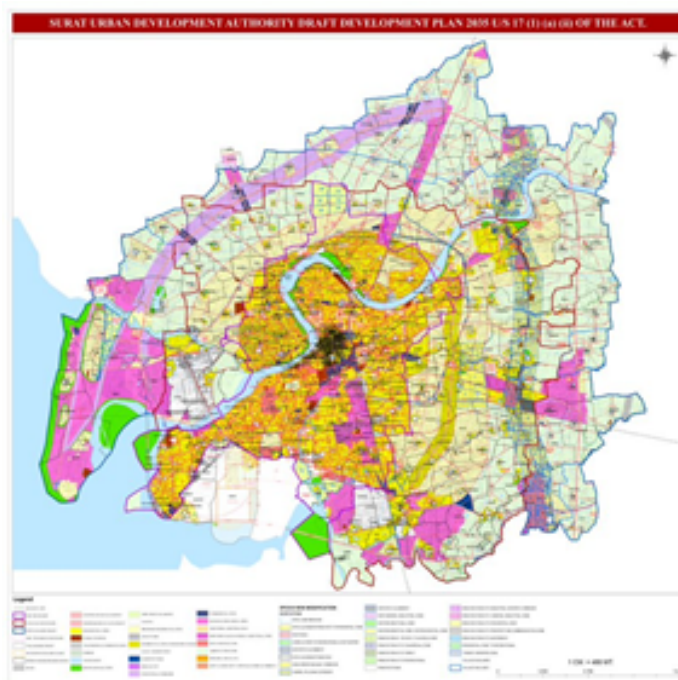


| Criteria | Details |
|---|---|
| Municipality Established in Year | 1852 |
| SMC Area | 472 Sq. Km. (as on SMC limit extended during June 2019 |
| Population | 4,466,826 (as per census 2011) |
| No. of Slum Pockets | 334 |
| Governing Body (ULB) | Surat Municipal Corporation (SMC) |
| Administrative Zones | 8 |
| No. of Election Wards | 29 |
| No. of Administrative Wards | 101 |

| | |
|---|---|
| **Literacy Rate** | 87.89% |
| **Male** | 91.22% |
| **Female** | 83.44% |
| **Temp** | Mean $27_0$ C |
| **Avg Rainfall** | |
| **Air Quality Index** | 70-110 (PM10) |
| **GDP (approximate) `** | $40 billion |
| **GDP Growth 2008** | 12% approximate |
| **Energy Consumption (Mtoe)- 2015** | 4.3 |
| **Energy Consumption (toe)** | 0.96 |
| **Tonne of oil equivalent (toe) is a unit of energy defined as the amount of energy released by burning one tonne of crude oil, approximately 42 gigajoules. Multiples of the toe are used, in particular the megatoe (Mtoe, one million toe)** | |
| **Source: Surat Municipal Corporation 2020** | |

*Key institutional arrangements at city level*

The role and responsibility of the ULBs is governed by: The Bombay Provincial Municipal Corporation Act (BPMCA), 1949 ? for Municipal Corporations (such as Ahmedabad, Surat, Vadodara and Rajkot) and Gujarat Municipalities Act, 1963 for smaller cities. The BPMCA deals with the four aspects namely: delineating a city area to ensure better urban governance; constituting municipal governments; prescribing powers, roles, and responsibilities of the municipal governments; and list of obligatory and discretionary functions that should be performed by the municipal authorities.

There are two main governing entities in Surat, namely SMC and SUDA. Apart from these two entities, Hazira Notified Area Authority governs the industrial hub of Hazira. SMC has a jurisdiction of 326 Sq.km (increased to 472 sq.km after June 2019).

SUDA, a state parastatal, is responsible for preparing the Master Plan (Figure 16 below gives the two-step planning process for Gujarat), which includes the area governed by the SMC. SUDA covers the SMC and 195 villages with an area of 722 sq.km. Under the Master Plan, the SMC is responsible for Town Planning schemes within the area under its jurisdiction. After the Master plan is approved, the newly urbanisable areas in the urban development area are then divided into smaller units of 100-200 hectares for which detailed physical plans are prepared. These micro level plans are called TPS - Town Planning Schemes. SUDA plans and regulates the urban growth outside the SMC area and also has the responsibility to control unauthorized developments.
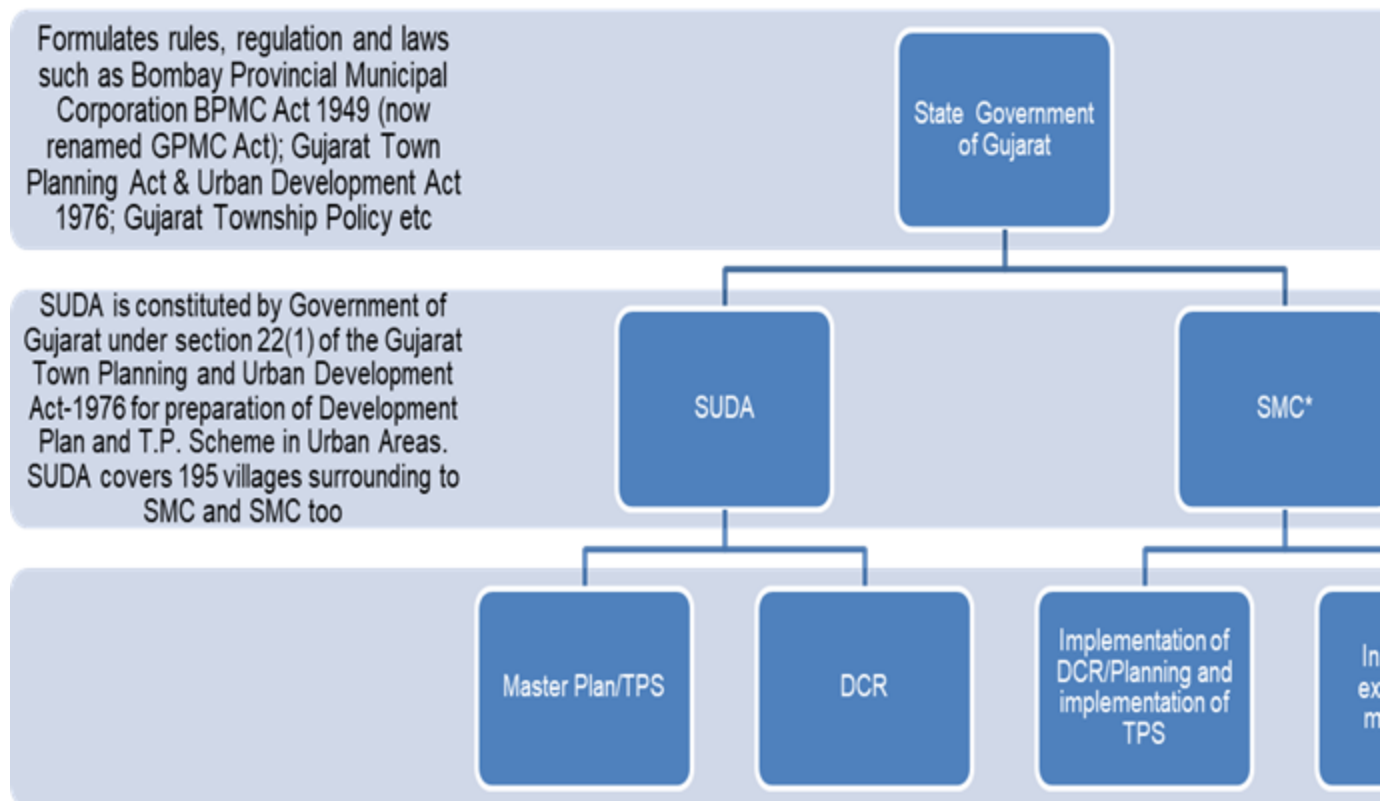
Figure 16: GOVERNANCE FRAMEWORK FOR SMC AREA

-

Surat city has formed various SPV (Special Purpose Vehicles) under Surat Municipal Corporation to look after special projects. These SPVs are Surat Smart City Development Corporation for implementation of Smart city projects, Surat Sitilink Ltd., to look after Surat BRTS & City Bus Service, Surat Outer ring Road Development Company to execute Surat ring road development work, Surat Diamond Research and Mercantile (DREAM)City Limited to develop Surat diamond city etc.,

Other institutions such as Gujarat Industrial Development Board (GIDB), Gujarat Pollution Control Board (GPCB), Public Works Department (PWD), State Highways Department and State Irrigation Department play key roles in the overall development of the city.

## Two Step Planning Process in Gujarat

**Step 1**

**Development Plan**
**(For the entire development area)**
- Identification of new growth areas.
- Spatial land use plan indicating kind of uses permissable in an area.
- Development control regulations.
- Policies and programs for achieving a variety of social, economic and political objectives.
- Projects for infrastructure development.
- Projects for infrastructure development.
- Cost estimations and resources mobilization strategies for implementing all of the above.

**Step 2**

**Town Planning Scheme**
**(For parts of the development plan)**
- Reconstitution of land parcels and creation of area level roads and parcels for amenities.
- Detailed infrastructure plans for the area.
- Cost estimations to implement the scheme.
- Statements for distribution of costs on the land owners.

**Planning**

**Implementation**

- Construction of City level infrastructure

- Redefining land parcel boundaries
- Construction of neighbourhood / area level infrastructure

Construction / development of land parcels as per the development control regulations
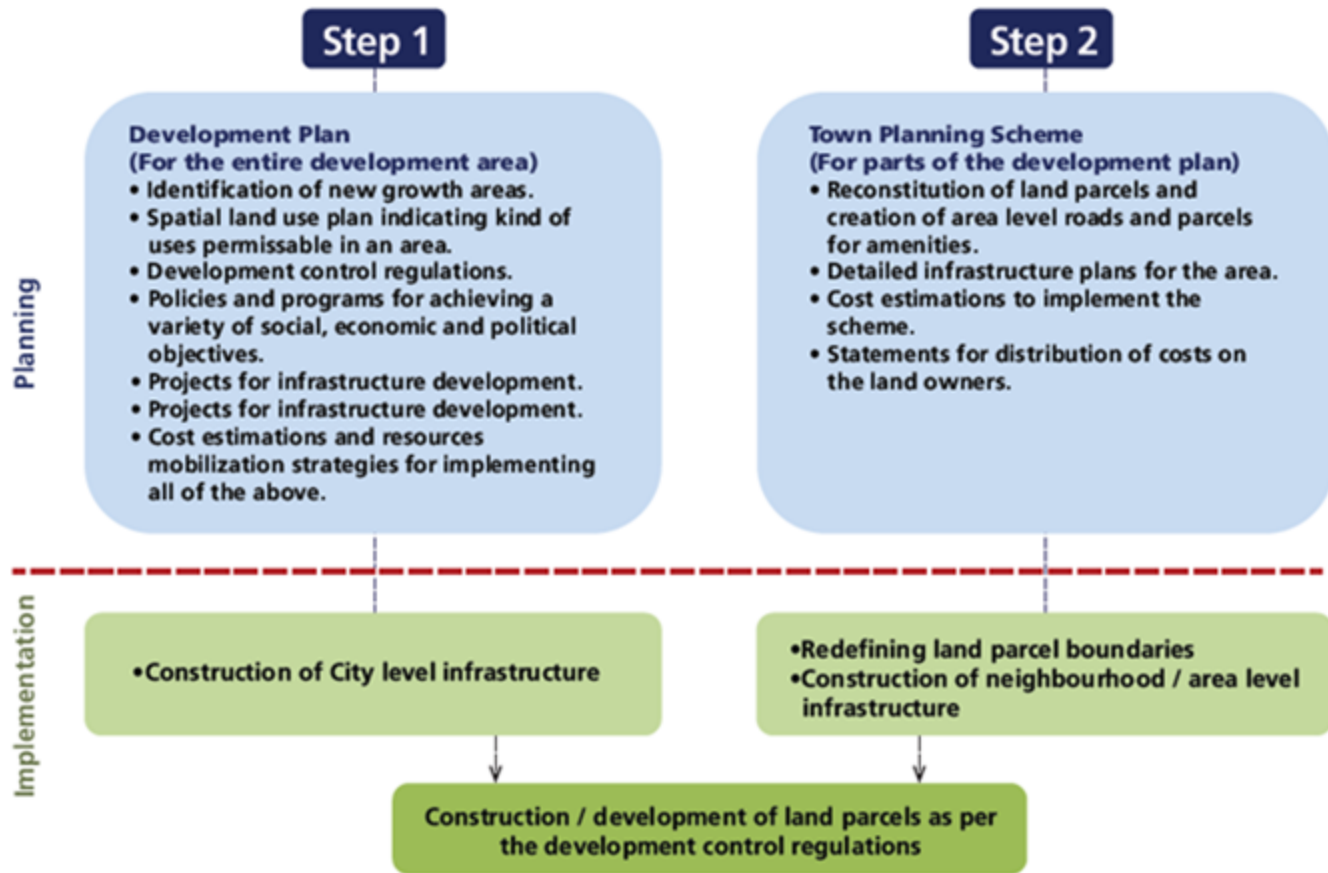
Figure 17: PLANNING PROCESS IN GURJARAT URBAN AREAS

*Urban Finance*

The key sources of revenue for SMC are primarily property taxes, water and conservancy taxes, professional taxes, and non-tax revenues such as fees and user charges.
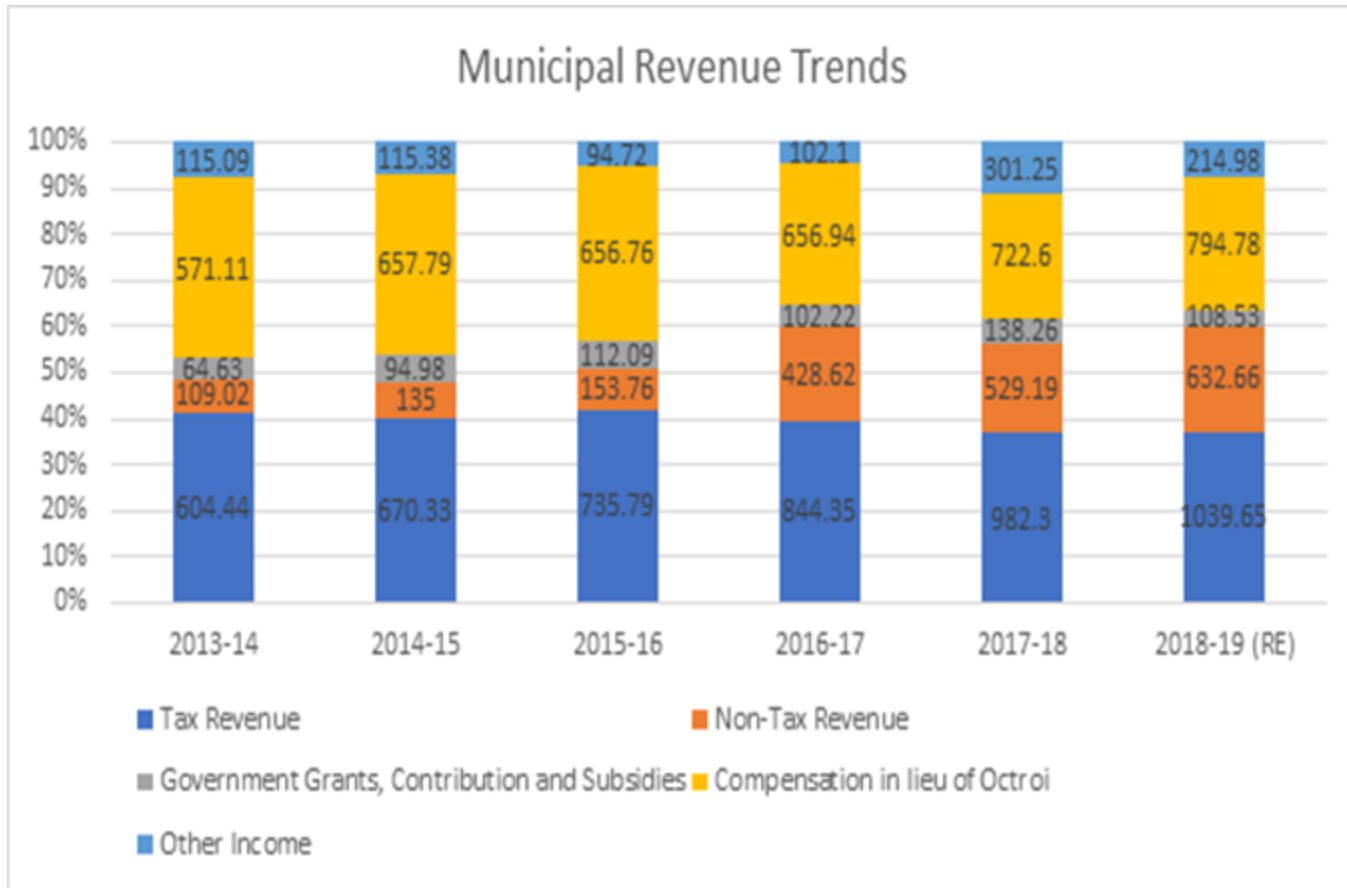
Figure 18: Change in source of revenue in surat

Tax and non-tax revenues constitute 39.17 and 15.87 % on average of the total revenue income over FY 2015-2019(RE). Tax revenue, primarily consisting of property tax, accounts for 31.57% of the total tax revenue. The property tax collection efficiency is at 97.52 % in financial year 2018.

SMC also draws support from state government grants and compensation grants in lieu of octroi, which together comprised 37.75% of the total revenue income on average during 2015-2019 (RE). The state government abolished octroi tax in seven cities including Surat effective from November 2007, which has broken links with the local economy. The share of compensation grants in lieu of octroi and government grants in total revenue income is estimated at 31% and 4.8%[8]².

The revenue generated covers the establishment expenses (~ 62%)[9], operations and maintenance (~19%) and administrative expenses (~14.18%). There is very little revenue surplus and thus limited funds for capital expenditures or to pay for loans taken to meet the capital expenditures. The capital expenditures are through a combination of capital grants from state governments and central government (through specific programmes, e.g., Atal Mission for Rejuvenation and Urban

Transformation (AMRUT), smart city mission and housing schemes). SMC capital receipts increased to Rs 1926.46 Crore (~250 million USD) in 2019. SMC has over the years also leveraged private sector partnerships in implementing infrastructure projects and mobilized about Rs 3023.52 Crore (~400 million USD). SMC has also taken experimental steps in mobilising funds from capital markets, Rs 200 Crore (~ 27.5 million USD) was mobilized for infrastructure projects to finance the schemes under AMRUT. The Figure 20 below shows a higher surplus as the revenues includes capital grants and subsidies received from the central and state government. SMC also draws support from state government grants and compensation grants in lieu of octroi, which together comprised 37.75% of the total revenue income on average during 2015-2019 (RE). The state government abolished octroi tax in seven cities including Surat effective from November 2007, which has broken links with the local economy. The share of compensation grants in lieu of octroi and government grants in total revenue income is estimated at 31% and 4.8%[8]. The revenue generated covers the establishment expenses (~ 62%)[9], operations and maintenance (~19%) and administrative expenses (~14.18%). There is very little revenue surplus and thus limited funds for capital expenditures or to pay for loans taken to meet the capital expenditures. The capital expenditures are through a combination of capital grants from state governments and central government (through specific programmes, e.g., Atal Mission for Rejuvenation and Urban Transformation (AMRUT), smart city mission and housing schemes). SMC capital receipts increased to Rs 1926.46 Crore (~250 million USD) in 2019. SMC has over the years also leveraged private sector partnerships in implementing infrastructure projects and mobilized about Rs 3023.52 Crore (~400 million USD). SMC has also taken experimental steps in mobilising funds from capital markets, Rs 200 Crore (~ 27.5 million USD) was mobilized for infrastructure projects to finance the schemes under AMRUT. The Figure 19 below shows a higher surplus as the revenues includes capital grants and subsidies received from the central and state government.
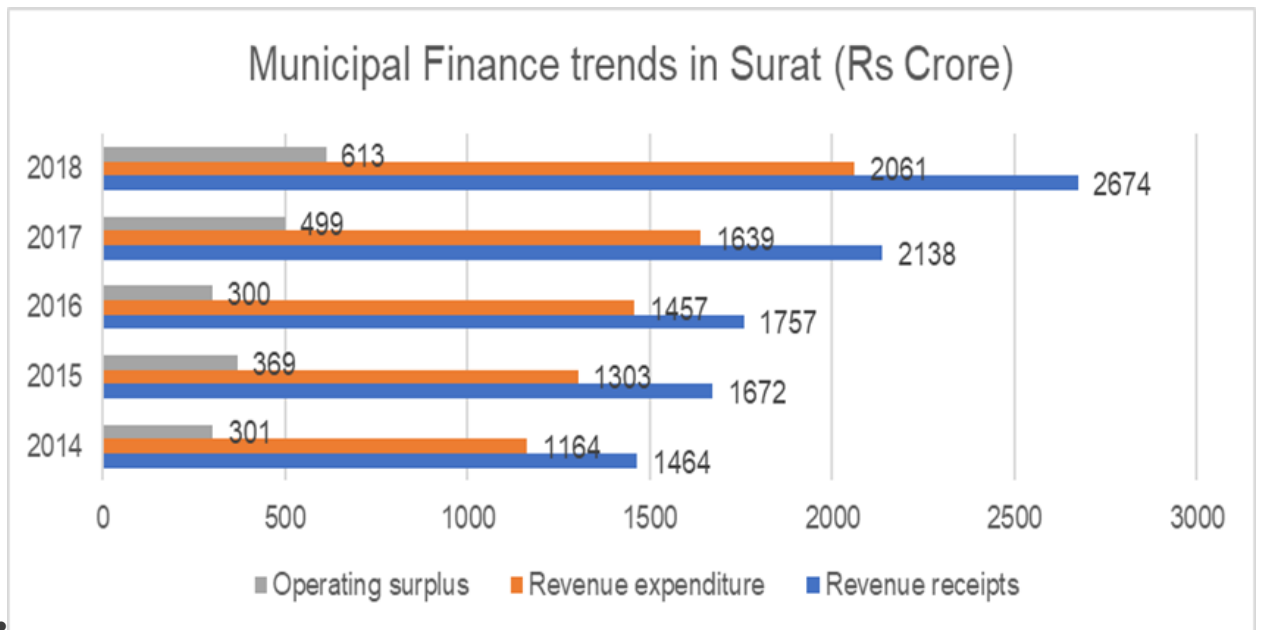


Figure 19: MUNICIPAL FINANCES IN SURAT[10]

Despite maintaining a healthy share of its own sources of revenue, Surat still has to depend on state and central governments for various infrastructure projects. The key challenge for SMC is predictability, quantity, and timing of the transfers, both for the compensation grants as well as other grants from state and central for infrastructure projects. This makes it difficult for long term planning of sustainable projects.

Projects related to environmental protection and biodiversity receive very little support from the municipal budgets. For instance, budget 2020-21 allocated Rs 58.46 Crore (~7.5 million USD) and Budget 2021-22 allocated Rs 91.97 Crore (~ 12 million USD) to city environment cell, which is less than 1% of the total municipal budget. Even when used under environmental head, the expenditures end up financing grey infrastructure due to lack of experience and knowledge of alternatives. For example, these limited resources for environmental protection were spent on creating concrete structures to provide bank protection and stop the spread of creaks.

*Data governance and technology*

SMC has a GIS based web platform, which was operationalized in 2015. Prior to that all records related to city were stored manually with the respective departments. There was no geo-referenced base map for Surat City and the budget proposals were discussed and managed without any spatial data.

SMC?s GIS web application has integrated more than 100 layers for use by various departments such as Town Planning Department, Property Tax Department, Roads, and transport, etc. For example, until 2015, Building approval systems and property tax databases were tech-enabled systems of SMC, however, they were not integrated with the GIS tools. Both the databases were on different platforms. Through the GIS platform, SMC integrated building approval systems and property tax databases. This platform integrated the following data benefitting both the organisation and the citizens:

- Mapping of Utility Systems like Water Supply, Sewerage System, Storm Water, Drainage System, Road Network and Solid Waste Management.
- Land Information System (LIS) which has spatial as well as non-spatial details of Town Planning Schemes, Development Plan, etc.
- Property Tax Mapping (i.e., Linking of Property attributes with Building footprints).
- Integration of Building Permission approval system.
- Incorporation of various physical features viz. Road Network, Railway, Water body, etc.
- Integration of existing applications like Property Tax, Shops and establishments, Solid waste management, etc.
- Budget proposals (Capital works) (Work in progress) and various permissions like building permission, Building use certificate etc.

The GIS web application is monitored at the ICCC of SMC, named as Smart City Centre (SMAC Centre), which was developed under Smart City Mission in 2016. The SMAC Center integrates & collaborates data from various departments, integrated with GIS. The use of the GIS platform has been made mandatory for planning and management of the projects. At present the platform covers the following syste

The city has made substantial progress in the digitization of information for management of city functions and maintenance. It is also slowly being used for planning infrastructure design, but it is still not used as a planning tool for densifying the city, improving mobility or planning new public transport infrastructure. It doesn?t capture information such as urban expansion, energy use, etc. A key missing element is the natural resources and green space mapping in the city. As the focus is on providing basic amenities and service the objective of addressing global and local environmental issues is not integrated as an essential element of amenities or service. Thus, absence of specific objectives such as reducing GHG emissions, reducing water use etc. impacts the creation of necessary information and using the information in making decisions to make development more sustainable. Without this level of data governance, municipal authorities undertake a more sectoral and limited operational planning approach rather than planning for sustainability, as they are unable to visualize the interconnectivity of their urban issues.

*Flood Resilience:*

In response to the 2006 flooding, the city developed a climate resilience strategy in 2010. The city administration recognised the need for an early warning system to prepare the city for flooding. The project, supported by Asian Cities Climate Change Resilience Network (ACCCRN), established a multi-stakeholder entity called Surat Climate Change Trust to design the early warning system including:

*Baseline*

As the demand for land to meet the various needs of Surat city has grown, SUDA through recent notification has expanded the SMC area and it includes a substantial part of the areas adjoining coastal zone within the Surat district boundary (See Map above). Further, as Surat is a sea resort attraction for the state population, SMC is also undertaking beach front development projects for recreational areas. The development in these areas is likely to result in increased vulnerability of new development areas if not planned considering the current and climate related vulnerabilities.

Surat City historically has been susceptible to flooding. The development and urban services in the past have been severely affected by high flood in river Tapi and creeks numerous times. It is estimated that about 90 % of the city area is affected by one or other climate hazards ? flooding, coastal storms, cyclones or inundation due to high tides and sea level rise, as most of the city and surrounding areas are less than 10 meters above mean sea level. The area within SUDA has a natural drainage pattern toward Tapi river with water flowing towards western and southern side of the city. The coastal areas (Hazira, Mora, Damka, Limla, Dumas, Bhimpore etc) between the mouth of river Tapi and Mindhola river are at low elevation. While the occurrence of cyclones has been low ? only two clones passing through the Gulf of Khambhat in the last 140 years (most recent was 1976), the tidal waves in 2007 have inundated areas that have never been submerged in earlier occasions, indicating the vulnerability of the city and future risks.

The rapid growth on both sides of River Tapi has led to major modifications in the hydrology in Surat and Hazira. Construction in the floodplains, filling in of the riverbed and floodplains at Hazira, silting up of the river bed due to embankment construction and high tides and Singanpore weir to prevent

ingress of tidal water into intake well have all led to reduction of river capacity and green areas that allows floodwater to spread out (Bhat et al, 2013).[11] In addition, the construction of Hazira industrial areas through reclamation of floodplain narrowed the mouth of the Tapi River and the closure of tidal creeks have exacerbated the inundation of the city area with flood water. The rapid urban growth, fueled by migration, has also resulted in about 11 % of the population living in slums and informal settlements (773 Slums). Many of these slums are located along the tidal creeks, along the river, between embankments and other drainage networks. These encroachments have led to degradation of riparian zones. The sea level rise due to climate change is likely to raise the risk of significant portions of the city area getting submerged. The expansion of city jurisdiction in the coastal zone and the lack of effective development regulations that prevent urban growth, especially high value real estate that derive value using seafront as the asset, will aggravate land degradation and destruction of ecologically sensitive coastal zone areas.

There are also a number of tidal creeks in the south-west part of the city, the new areas are included under the SMC. With the change in future tidal conditions and increased population growth, people along (especially poorer sections of the population) the tidal creeks will be at a high risk. In fact, the tidal floods in 2004 affected nearly 400,000 people and there was power failure for two days and water supply was disrupted for a week and city areas were not accessible for two days.

Additionally, some parts of the Hazira Notified Area (adjacent to the Dumas Area) have been developed through land reclamation of floodplains of River Tapi. As a result, the capacity of river Tapi significantly reduced at the locations where the river meets the sea. The Hazira creek is also home to a variety of birds and species of vegetation at the mouth of the river. While the Development Plan reserved these areas as eco-sensitive areas, this biodiversity area is on the verge of losing its natural ecosystem to the heavy industrialization and peri-urban development.
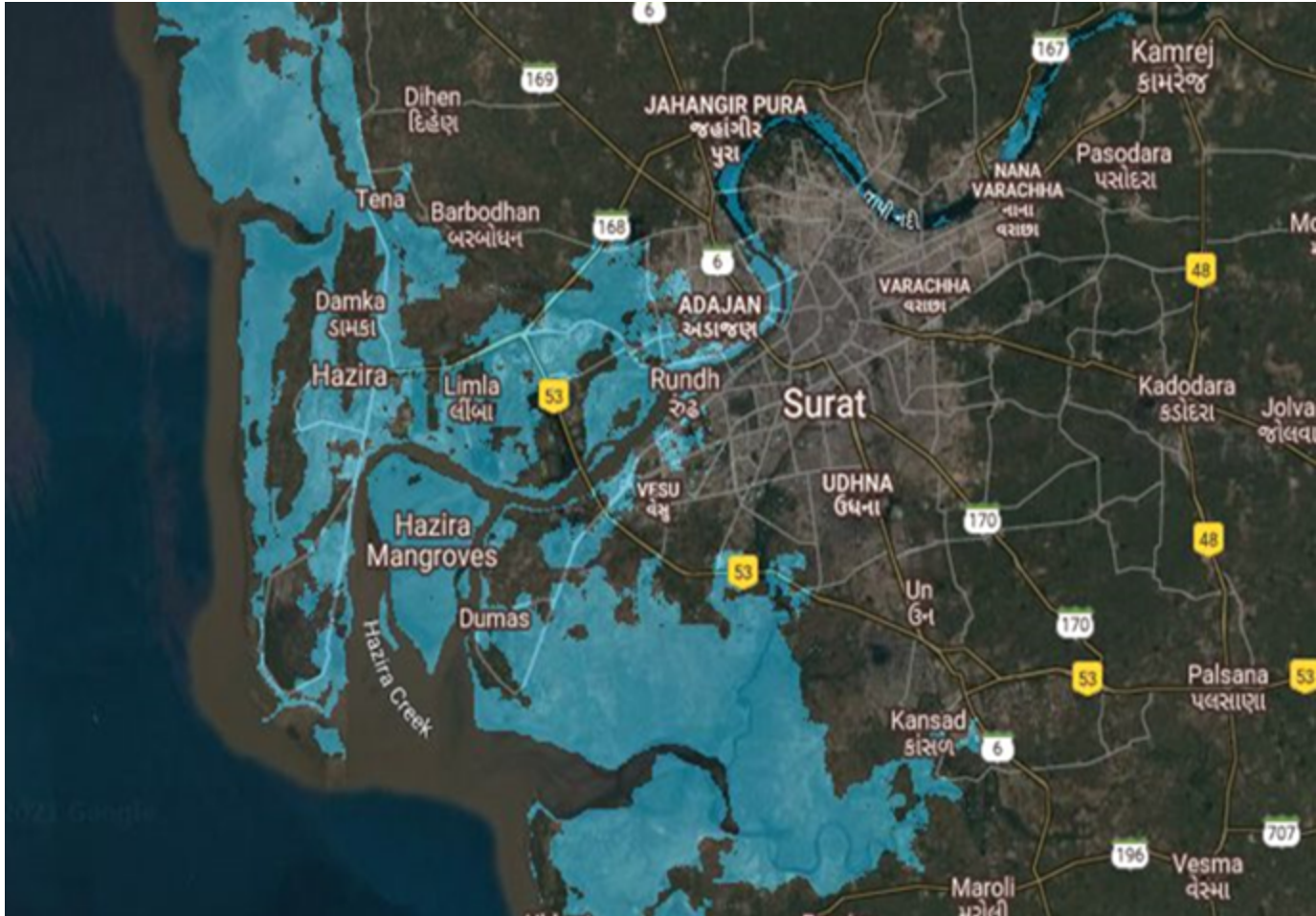
Figure 20: LAND PROJECTED TO BE BELOW TIDELINE IN 2050

With increasing sea levels and increased frequency of extreme events, the city is likely to continue experiencing floods in the future. During the last century, there has been an increase of sea level along the Gulf of Cambay by around 0.67 m. if such trends prevail in future, this could have serious implications for the city. Figure 20 shows the project areas below the tidal line in 2050 as a result of sea level rise.

Rapid urbanization of peri-urban areas which are also the low-lying coastal areas has led to exposure to tidal flooding and degradation of ecosystem services. The rapid transformation of peri-urban and coastal areas due to physical alteration in tidal entrance, land reclamation (at Hazira), construction of jetties, destruction of mangroves has led to coastal erosion and loss of sub-aerial landmass into sea. Surat district has experienced 18 Km of erosion due to the anthropogenic and natural processes. The severity of coastal erosion also impacts the physical and environmental vulnerability of the coastal areas and therefore has severe implications for the city?s sustainability in the long run.

The coastal area has a number of sensitive coastal zone ecosystems (mudflats, mangroves, wetlands, etc.). Though these zones and the coastal zones are governed by the DRC and coastal zone regulations,

these regulations are treated as a land use regulations. Thus, the land under these ecosystems may not be allowed for development but the development in surrounding area doesn?t assess the impact of development on these ecosystems and undertake measures to mitigate the impacts. Further, the planning doesn?t consider the future impacts of climate change in the coastal zone area of Surat. All the infrastructure developed in the region will be highly vulnerable to economic losses from future flooding resulting from sea level rise and increased rainfall.

As SMC and SUDA prepare a large number of TP schemes at once, the implementation takes place in a phased manner over several years. This need for phasing and sizing is not prescribed in the development plan. As the Development Plan doesn?t talk about phasing, the phasing of these schemes largely rests with the authorities who prioritize some schemes over others (Sanyal and Deuskar, 2012, cited earlier). The lack coordination of contiguous TP schemes affects the management of larger concerns of urban sustainability especially in areas around sensitive ecosystems and coastal zones. This specifically affects the natural ecosystem spanning more than one TPS, potential for contiguous green spaces, or taking into account the mobility infrastructure. The current TP scheme preparation and implementation does not allow for creation of contiguous large land parcels, unless it is for specific purposes, for public purposes. The small and scattered land parcels reserved for open spaces and low-income housing cannot be used meaningfully.

There is no overall coastal zone management plan developed in light of the climate vulnerabilities to this area that could assess the impact on coastal areas with SMC. There is no assessment of how the resilience could be enhanced in these areas and how the preservation and enhancing of natural coastal ecosystems could support reducing the impacts. As mentioned above the current practice is to restrict development in these areas, but no measures are plans existing to ensure how the ecosystem health could be managed. In addition, protection measures have been in form of grey infrastructure to cordon the area of without taking into account the interaction of these areas, especially the water bodies and wetlands with the water flow regime in the area. There is no effort to use nature-based solutions (NbS) to preserve and enhance the health of the system.

The development of these areas will increase the population in these areas. The development of sea front as a recreational areas would further add to the human pressure on these areas. The access to these areas through vehicular traffic too is likely to increase the negative impacts on the ecosystems. The current transport plans too don?t consider the impact of transport infrastructure on growth in the areas, especially sensitive ecosystems, and specially in development of public and NMT infrastructure integrated with the sea beach recreational areas.

The city has made substantial progress in the digitization of information for management of city functions and maintenance. It is also slowly being used for planning infrastructure design, but its use as a planning tool for densifying the city, improving mobility or planning new public transport infrastructure. A key missing element is the natural resources and green space mapping in the city. It doesn?t capture information such as urban expansion, energy use, etc. As the focus is on providing basic amenities and service the objective of addressing global and local environmental issues is well integrated as an essential element of amenities or service. Thus, absence of specific objectives such as reducing GHG emissions, reducing water use etc. impacts the creation of necessary information and using the information in making decisions to make development more sustainable. Without this level of

data governance, municipal authorities undertake a more sectoral and limited operational planning approach rather than planning for sustainability, as they are unable to visualize the interconnectivity of their urban issues.

**Baseline projects**

Surat Municipal Corporation (SMC) & the Southern Gujarat Chamber of Commerce & Industry collaborated in 2008 to (i) assess the climate change impact on Surat (ii) identify the resultant challenges and (iii) devise strategies to address the challenges. The process identified some of the critical sectors such as water, energy, environment, transportation, flood management and community health. The analysis included an assessment of flood risk vulnerability of different sections of the population due to increased precipitation, frequent flooding, changes in disease patterns, sea level rise, increasing energy demand etc.

SMC, in 2012, promoted and registered (under Bombay Public Trust Act 1950) a special purpose vehicle, Surat Climate Change Trust (SCCT) that included members from various institutions including SMC, SGCCI, Sardar Vallabhbhai National Institute of Technology (SVNIT), Center for Social Studies (CSS) and state level stakeholders such as NWRWS as well GSDMA and others at Surat. The initiatives and work under SCCT and the Asian Cities Climate Change Resilience Network (ACCCRN) have led to identification of nexus between various urban systems, challenges, vulnerabilities and the imperatives of climate change and the risks it imposed on the urban systems. The City Advisory Committee adopted a collaborative and integrated approach that involved a wide array of stakeholders and a number of workshops were conducted to create resilience strategies.

In 2013, SMC and SCCT have collaborated to participate in 100 Resilient Cities, pioneered by the Rockefeller Foundation. The Resilient Strategy for the city proposed activities around connectivity, housing, quality of urban service, employment, and social cohesion.

 <u>National Smart Cities Mission</u> ? Surat is one of the 100 covered under the mission. Under the initiative the city has undertaken a number of initiatives to use technology in better management of the urban services and increase livability. Some of the key pan city projects funded under the mission are: Smart City centre and integrated traffic and mobility centre (see below); Enterprise resource planning and GIS system for process automation of city operations and monitor performance; Energy efficient street lighting; availability of wi-fi connectivity across the city, etc. The city has also identified a number of area based project for sustainable economic development, such as, water supply management (including water recharging), recycling and reuse of storm water; affordable housing; smart parking, etc.

<u>SMAC (SMArt City) Center and Integrated Traffic and Mobility Administration Center (IT-MAC):</u>

SMAC Center is a control centre for the city for effective and efficient delivery of all civic services. The centre connects the functioning of various departments and supports all the departments in maintaining civic services delivery standards.

IT-Mac centre houses various departments involved in managing and mobility like BRTS, City Bus, Traffic Police, RTO, Fire, Emergency Services, etc. the centre through IT-enabled applications supports all the concerned agencies to coordinate and support each other for smooth traffic operations.

Surat Biodiversity Park: the project rejuvenated the wasteland of Kankara Khaadi (creek). Under this project a biodiversity park for preserving flora and fauna will be developed and the wasteland will be made accessible to the public by developing it into a usable public space. The project was funded under the CITIIS grant. Through the project, the city envisages to facilitate collaboration between various stakeholders, Rejuvenation of existing wasteland into Bio-Diversity Park and creating lung space for the city. The project also intends to reduce runoff of storm water through creation of retention ponds and increasing green cover in the area.

# International Linkages

SMC has also leveraged initiatives, technical support and tools created by global organizations to support cities to become more sustainable and be able to respond to sustainability challenges. Some of those key initiatives working at the intersection of climate change mitigation, political leadership, capacity building, urban planning, nature-based solutions and gender equality are:

The Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC): The World Resources Institute, C40 Cities and ICLEI have partnered to create a GHG Protocol standard for cities known as Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC). The GPC seeks to help cities develop a comprehensive and robust greenhouse gas inventory in order to support climate action planning and help cities establish a base year emissions inventory, set reduction targets, and track their performance. C40 Cities assisted the city in creating the first GPC compliant GHG inventory for the year 2015-16. This has now been subsequently revised to 2017-18. The city publicly shares its GHG data with the Carbon Disclosure Project (CDP) platform annually.

100 Resilient Cities (100 RC): Surat Municipal Corporation (SMC) & the Southern Gujarat Chamber of Commerce & Industry collaborated in 2008 to (i) assess the climate change impact on Surat (ii) identify the resultant challenges and (iii) devise strategies to address the challenges. The process identified some of the critical sectors such as water, energy, environment, transportation, flood management and community health. The analysis included an assessment of flood risk vulnerability of different sections of the population due to increased precipitation, frequent flooding, changes in disease patterns, sea level rise, increasing energy demand etc.

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100 Resilient Cities (100 RC): In 2013, 100 Resilient Cities provide support to cities through (i) funding for a Chief Resilience Officer who leads the resilience efforts; (ii) resources for drafting a resilience strategy; (iii) access to private sector, public sector, academic, and NGO resilience tools; and (iv) membership in a global network of peer cities to share best practices and challenges. SMC appointed a Chief Resilience Officer and subsequently resilience analysis for Chennai was undertaken and a Resilience Strategy was prepared. Activities in sectors such as Connectivity & Mobility, Affordable Housing, Water Availability & Quality Dominant Sectors of Employment & Economic Dependency, Eco -system & Environmental Regulations and Social Cohesion were proposed.

TABLE 4: RELEVANT PUNE SURAT URBAN DEVELOPMENT PROJECTS

| Project and funder | Description | Duration | Relevance for project | Budget |
|---|---|---|---|---|
| Smart Cities Mission | SMAC Center & Integrated Traffic and Mobility Administration Center (IT-MAC) for for effective and efficient delivery of all civic services. | 12 months | Integrating the databases and systems developed as part of the projects and leverage the ICCC to deliver integrated planning approaches. | US $ 13.3 million |
| City Investments to Innovate, Integrate and Sustain (CITIIS): Ministry of Housing and Urban Affairs (MoHUA), Agence Fran?aise de D?veloppement (AFD) and the European Union (EU) | Surat Biodiversity Park: The project is a biodiversity park for preserving flora and fauna will be developed and the wasteland will be made accessible to the public by developing it into a usable public space | - | Improved cross-learning by improving and informing subsequent development and preservation of ecosystem services and sensitive areas. | US $ 14 million |

| Gujarat Resilient Cities Project (Phase 2): World Bank | Tapi Riverfront and Rejuvenation Project (Phase I) and broader institutional and financial performance improvement in Surat. The project will focus on (i) building flood resilience, (ii) improving water and wastewater infrastructure services and (iii) improve financial and institutional capacity of SMC | 60 Months | Cross learnings for both the projects as the activities proposed under both the projects cover flood risk management, urban regeneration and protection of ecologically sensitive areas. | US $ 196.30 Million |
|---|---|---|---|---|

## c. The Proposed Alternative Scenario with a description of outcomes and components of the Project

The project aims to accelerate the sustainable development of Indian cities to achieve global environmental benefits of reduced greenhouse gases, biodiversity conservation and reduced land degradation. To achieve this objective, the project will focus on promoting integrated planning, integration in the sense of multi-sectoral and multi-level (different levels of government) as the backbone for achieving long-term transformation to sustainable urban environments.
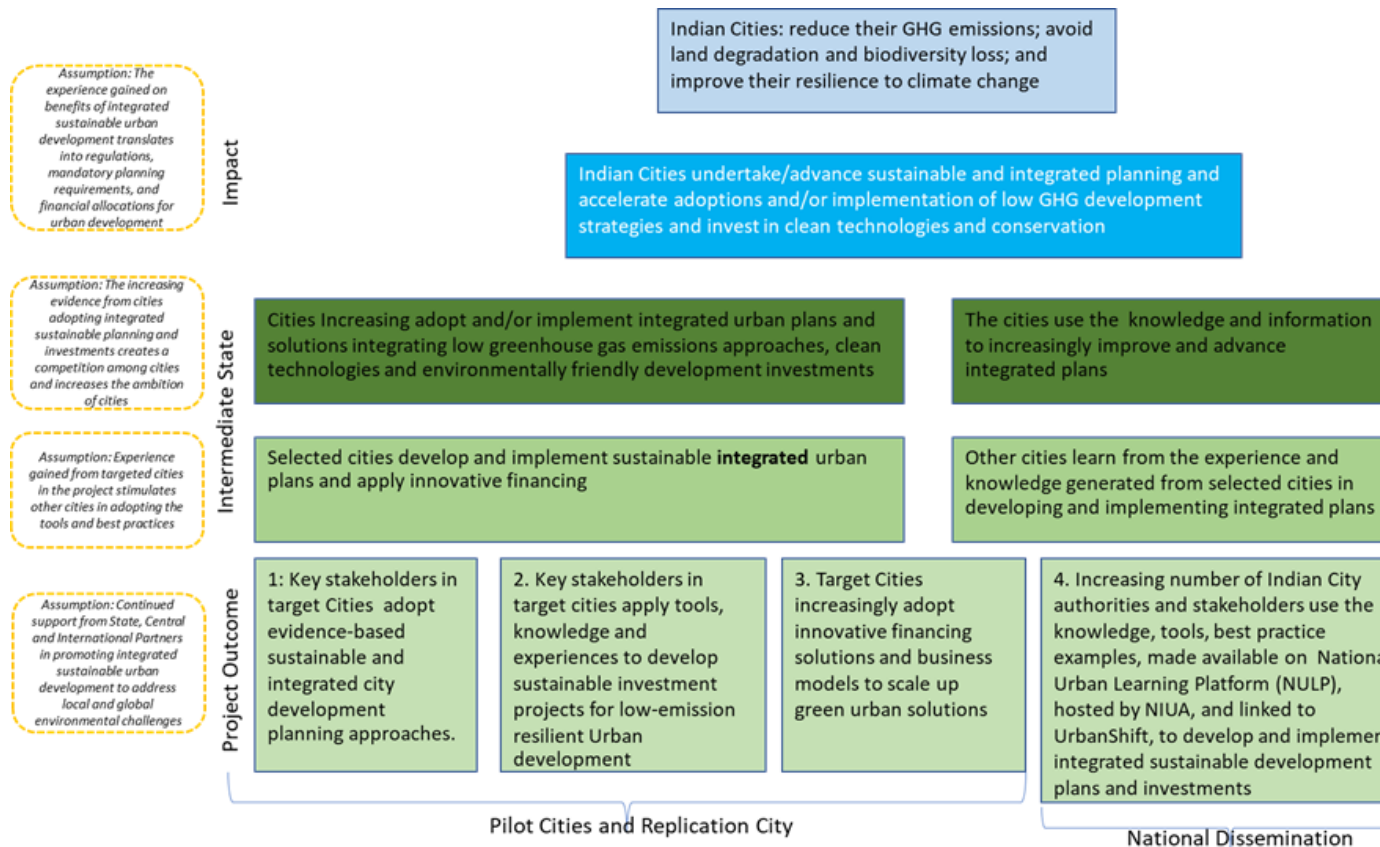
The project will support six urban areas (three primary target cities and three replication cities) to embed integrated urban planning into their planning and urban development processes. The project will strengthen urban governance by supporting Chennai, Pune, and Surat to develop or strengthen digital platforms to foster coordination between the multiple actors (public, private, civil society, etc.) involved in urban development across sectors. The digital platforms will incorporate geospatial data and urban sustainable development indicators, facilitating integrated sustainable planning and their connection with sustainable development goals. The project will also support the cities to demonstrate the social, economic and environmental viability of integrated sustainable urban solutions for addressing city development challenges. Through these interventions, these cities will develop experiences, good practices and lessons learned on piloting integrated approaches which are aligned with the planning efforts undertaken concomitantly in component 1 and those undertaken prior to the project. The interventions will focus on supporting each of the cities to achieve low-carbon, and biodiversity conservation centred urban development, through integrated solutions such as low-emission resilient green transit corridors, integrated coastal zone Urban Development plans to use natural ecosystems and their conservation in enhancing the resilience of the coastal zones, protect

biodiversity and reduce GHG emissions, integrating flood management in urban spatial planning and use of green-blue infrastructure to support the storm water drainage systems. They include, inter alia, better use and management of data through digital platforms; enhanced planning, through which details of specific opportunities for NbS and enhanced resilience, will be identified; investments in NbS, including tree planting, green corridors and water body rejuvenation; financing support, which raises the profile of NbS in discussions of investment priorities; and knowledge management activities, which will further raise awareness of the cost effectiveness and multiple benefits associated with NbS.

The project will also facilitate the development and execution of business models and innovative financial instruments for scaling-up and replicating integrated investments in cities. On the primary target cities, business models and innovative financing solutions will be developed to facilitate the scale up of solutions tested in component 2 and aligned to the integrated plans of component 1. This will include business models for facilitating private sector participation

The project will promote the scale-up of integrated planning practices and enhanced action and ambition on sustainable urban development through knowledge sharing and capacity-building with all Indian cities. Building on the experiences, good practices and lessons learned through components 1 to 3, the project will support the development of a Ministry-hosted sustainable cities online platform, which will harbour all knowledge gleaned from the city and financing experiences. The platform will serve as a conduit to channel such knowledge to the global UrbanShift platform and also support local actors to connect to such global resources. Furthermore, a national capacity-building programme will build upon the platform to train local, state and the central government representatives in undertaking integrated planning. The programme will be open to Indian cities beyond the primary target cities, supporting key stakeholders to draw upon good global practices in their urban planning and development processes.

# Theory of change

**Impact**

Indian Cities: reduce their GHG emissions; avoid land degradation and biodiversity loss; and improve their resilience to climate change

Indian Cities undertake/advance sustainable and integrated planning and accelerate adoptions and/or implementation of low GHG development strategies and invest in clean technologies and conservation

*Assumption: The experience gained on benefits of integrated sustainable urban development translates into regulations, mandatory planning requirements, and financial allocations for urban development*

**Intermediate State**

*Assumption: The increasing evidence from cities adopting integrated sustainable planning and investments creates a competition among cities and increases the ambition of cities*

Cities Increasing adopt and/or implement integrated urban plans and solutions integrating low greenhouse gas emissions approaches, clean technologies and environmentally friendly development investments

The cities use the knowledge and information to increasingly improve and advance integrated plans

*Assumption: Experience gained from targeted cities in the project stimulates other cities in adopting the tools and best practices*

Selected cities develop and implement sustainable **integrated** urban plans and apply innovative financing

Other cities learn from the experience and knowledge generated from selected cities in developing and implementing integrated plans

**Project Outcome**

*Assumption: Continued support from State, Central and International Partners in promoting integrated sustainable urban development to address local and global environmental challenges*

1: Key stakeholders in target Cities adopt evidence-based sustainable and integrated city development planning approaches.

2. Key stakeholders in target cities apply tools, knowledge and experiences to develop sustainable investment projects for low-emission resilient Urban development

3. Target Cities increasingly adopt innovative financing solutions and business models to scale up green urban solutions

4. Increasing number of Indian City authorities and stakeholders use the knowledge, tools, best practice examples, made available on National Urban Learning Platform (NULP), hosted by NIUA, and linked to UrbanShift, to develop and implement integrated sustainable development plans and investments

Pilot Cities and Replication City

National Dissemination

# Component 1 ? Evidence-based sustainable and integrated planning

*Outcome 1: Key stakeholders in target Cities adopt evidence-based sustainable and integrated city development planning approaches*

This component responds to and reflects the Sustainable Cities Impact Program approach for transformational change in urban areas as its activities mirror the program in a way that is contextualized to the national requirement.

The component will focus on addressing two of the key barriers:

(i)        Insufficient policies and/or processes to ensure synergies between various plans to facilitate integrated planning.

(ii)       Limited capacity, enabling tools and adequate data-driven planning.

It will facilitate integrated and inclusive urban planning by city governments, collaborating with state governments, to address critical systemic drivers of urban sprawl, GHG emissions, and biodiversity threats. It will facilitate coordination between different plans that are available for urban development and strengthen the Integrated Command & Control Centre (ICCC) developed under the Smart City initiatives by leveraging and processing data.

The project will support multi-sector, integrated planning in order to demonstrate economic, social, and environmental viability in addressing urban challenges. The demonstration action will also bring together the key actors who have a mandate for respective sectors to foster a better understanding of achieving efficacy through integrated planning and seed the process of establishing institutions for coordination among the various bodies, state and city. Under this component, the following processes will be covered:

(i)        Tools to enhance mechanisms for inter-agency and stakeholder coordination.

(ii)        Digitization of data and data gathering infrastructure to enable consideration of natural and human-made assets in developing urban area development plans.

(iii)        Tools and training provided to integrate natural ecosystems, climate risk exposure, spatial dimensions, city services and other livable city indicators in developing master Urban Development plans.

The sectors where demonstrations are proposed are those which are subject to overlapping jurisdictions and mandates, among others. They are diverse in order to generate lessons and models for the primary target cities as well as others in India. The key urban challenges being addressed through these demonstrations include:

 (a)  Urban congestion and sprawl which also leads to air pollution and increased GHG emissions.

(b)  Flooding and disruption of urban services due to non-consideration of natural habitats and  natural water bodies in urban planning.

(c)  Urban Heat Island due to depleting green cover/biodiversity loss due to unplanned expansion, leading to exacerbated climate risks.


The component strengthen coordination among various actors to undertake integrated planning through demonstration of integrated urban planning to address the primary urban challenges identified by target cities and. The component will also strengthen technical capabilities by making available new planning tools and approaches and undertaking capacity building in using these tools and approaches. The component will support enhanced planning and coordination by strengthening data based planning through incorporating geospatial data into existing digitized data platform used by cities for operations. These demonstrations will provide much needed experience and enable the city and state authorities to replicate the experience to other similar thematic areas building upon the demonstration. The practical example will also provide best practice examples to other cities through the national sustainable cities platform thus addressing one of the key barriers of lack of actual examples. The work of component 1 will also be shared through peer-to-peer learning opportunities for other cities and thus create a wider community of urban planners and practitioners in a position to apply the knowledge. The component will also enhance the evidence based planning and implementation through support to use digitized data for better and integrated planning.

The component will support the city develop integrated plans through participatory and gender-sensitive processes, supporting the preparation of a medium- to long-term roadmap for achieving urban sustainability through integrated actions.

**Output 1.1:** Greater Chennai Corporation (GCC) and key stakeholders have access to knowledge, tools, and systems for data collection to undertake integrated spatial plans for managing flood risks and water body restoration through nature-based solutions (NBS). (**ADB Led**)

This output will support GCC in addressing the key climate challenges in Chennai, characterized by alternating intense flooding and drought periods. This is due, in large part, to city development planning approaches, in which land allocation for infrastructure (buildings, roads, industries, etc.) is not interlinked with natural drainage patterns of the land, conservation of natural water bodies, and loss of green spaces and paving of most of the land ? which results in reduced seepage. This is compounded by lack of adequate storm-water drainage and maintenance. Urban sprawl has aggravated the challenge by expanding this unsustainable land use over a larger area. The output will support the GCC in better flood management, and consequently drought management (as increases green infrastructure will facilitate seepage and reduce the run-off speed and erosion of silt along with rainwater which currently drains off into rivers and sea), by integrated land use planning, increased use of green infrastructure for maintaining conservation of water bodies and drainage channels, and implementing a monitoring system that enables better coordination across stakeholders.

This output will build on the investments by GCC to improve flood management in the Chennai-Kosasthalaiyar River basin. The ADB and GCC financed infrastructure project will install / strengthen storm water drainage and pumping stations, include restoration of existing drainage channels and construction of catch pits, and increase groundwater recharging.

GEF funds will support coordination among key city and state level government entities that have a development planning and infrastructure mandate in the GCC jurisdiction through an already existing Coordination Group (CG). The group consists of GCC, Officials from Madurai Corporation along with officials from MAWS, Finance Department and other relevant entities as special invitees on a need basis. The Coordination group will also engage with departments responsible for gender issues and inclusion of economically weaker sections (EWS). The CG will support the delivery of the intervention in the primary and the replication city. The CG will guide the work of all outputs, finalize deliverables under the outputs, and facilitate the integration of the deliverables into entities' respective planning and decision-making processes. The engagement of the entities through the CG will highlight the benefits of coordination among them as well as work as a tool of capacity building by hands-on training on integrated low emission resilient gender response and inclusive development. The lessons learned and the process of coordination will be documented. The lessons learned will be adopted as good practice by entities in the CG and also provide a template for the state and city entities over issues with overlapping mandates to promote a more integrated approach and sustainable approach.

The output will address the gap of lack of tools accessible to City and State entities for urban spatial planning and infrastructure development for integrated planning of land use and use of green infrastructure using NbS to address the flood and drought management in Chennai. It will support development of a methodology to identify flood risk zones and based on this, development of

guidelines for identifying and regulating the use of high-risk areas for built up infrastructure. The guideline will be integrated into the Urban Development plan process of the GCC.

To increase the use of green, rather than grey, infrastructure for flood management and drought the output will support development of a manual for developing green infrastructure (This will built on existing knowledge products such as toolkit developed by the CFF: https://cff-prod.s3.amazonaws.com/storage/files/ZuhZ6NLqbmb7PPiR8872Aod04b1fIhkyFVrl3PV4.pdf.) This will address, both, increasing the green areas and preserving biodiversity. This will also reduce the risk of damage to the water bodies and river ecosystems. The project will demonstrate use of green infrastructure using NbS in rejuvenating an existing water body in the Chennai-Kosasthalaiyar basin. The output will use this experience to develop a guideline for replicating the experience for rejuvenating and managing the natural drainage patterns and the water bodies using NbS (output 2.1). The guidelines will include: a) 'gap analysis' to promote and implement NbS; b) define areas for capacity development and training; c) explore options for new or amended policies; d) internalize NbS principles; e) look at NbS typologies relevant to the context; f) identify and expand on a range of approaches and scenarios; g) calculate benefits of NbS, h) clarify roles of stakeholders, i) set technical and financial targets, and j) explore options for resource mobilizations/diversification, among others.

A key challenge for the cities is lack of data on the natural resources and infrastructure to provide better visualizing of the urban planning as well as conservation of green areas and water bodies to enhance resilience against floods. The city also lacks data on monitoring and management of assets for flood management as well as information flow during the event to mitigate the flood impacts. The output, to enable data-based monitoring and management of urban development, will support the development of Flood Resilience Index (FRI). The output will support development of a flood resilience indexing framework with measurable indicators, calculating basin and city-wide FRIs and benchmarking it against other cities along with recommending/supporting various measures to improve the FRI. FRI will consider institutional aspects and non-structural measures in addition to structural elements, and will be regularly updated to guide the priority actions. FRI will be used as a basis to assess city's performance related to flood resilience and support designing and undertaking targeted actions to increase resiliency by reducing flood hazards, exposure, and vulnerability.

This will be complemented by a Flood Citizen Observatory (FCO), based on a software platform, which will be developed to allow citizens to share information pertinent to floods through different devices like web browsers, mobile applications, or SMS. This can be considered to be integrated with the existing Integrated Command and Control Centre (ICCC) built through the Smart City Mission. This can be effectively used to share the damages caused by the flood and prevent or minimize the impacts of flood events. The approach broadly involves selecting many volunteers in each ward and zone area, providing them awareness, developing suitable platforms/approaches for sharing information related to flood (such as flooded areas, water levels in lakes, channels, and the riverbed), analyzing and using that information for decision-making. During the selection of volunteers, care will be taken such that there are at least 50% women in the volunteer population identified for the training. The volunteers acting as human sensors locally observe important parameters of flood risk management. Additionally, the information gathered could be used to develop flood maps or risk maps for the affected population and estimate damages, compensations, and relief works. The FCO could also be expanded to enable

citizens to participate in awareness campaigns, call for rescue support, submit the grievance, and provide suggestions for urban planning improvement.

Women, EWS and persons with disabilities (PWD) are the most vulnerable groups from flooding and droughts in society due to lack of accessibility & and delayed access to support infrastructure. The measures to increase resilience will thus help them the most. The output will support baseline mapping of impacts of flooding on women, EWS and PWD. The solutions identified also be assessed on the impacts disaggregated by sex and economic categories. Specific measures and strategies will be identified to ensure the measures result in equal benefits for all. This will build on GCC?s effort to rehabilitate four disaster relief camps to be gender-responsive and socially inclusive. The FRI will also include indicators to capture the disaggregated impacts to enable feedback into the system and assess how well the implemented measures are inclusive. FCO will specifically focus on ensuring balanced representation among men and women in participatory activities.

The deliverables and experience will be used to inform and build capacity of city and state entities staff participating in the coordination group. The capacity building activities will also include non-government stakeholders covering community representatives, civil organizations working on gender and inclusivity issues, and importantly Private sector. Private sector stakeholders will also be engaged with the view of their participation in contributing to partnering in implementing the solutions. The capacity building will be led by GCC in collaboration with other partners, such as Anna University (Department of Civil Engineering) and/or Tamil Nadu Institute of Urban Studies (TNIUS), (accredited by NIUA).

| | | Deliverables |
|---|---|---|
| 1.1.1 | | Coordination group of relevant Chennai and Tamil Nadu government entities strengthened to guide the developments of deliverables and their validation |
| | | Coordination group of relevant Chennai and Tamil Nadu government entities established |
| | | Lessons learned on coordination documented and integrated into planning processes of participating Government entities |
| 1.1.2 | | Tools for gender responsive and inclusive integrated spatial plans for managing flood risks and water body restoration through NbS |
| | | Guidelines for integrating flood hazard zoning with spatial plans and land use, building and development regulations for urban planning, based on baseline data collected and analysed for the GCC plan area (co-financed by ADB) |
| | | Manual for Green infrastructure design including rainwater harvesting (co-financed by ADB) |
| | c | Guidelines for restoration urban water bodies using NbS measures (funded by GEF) |
| | d | Guidelines for restoration of urban water bodies through NbS shared with other departments in GCC and other relevant government entities such as CMDA, Revenue Department & Public Works Department. |
| 1.1.3 | | Enhanced ICCC |

| | a | Flood Resilience Index (FRI) and Flood Citizens Observatory (FCO) developed and integrated with the ICCC to monitor and guide the flood resilience of Chennai with participation of citizens (co-financed by ADB) |
|---|---|---|
| 1.1.4 | | GCC staff and urban practitioners are trained in the use and application of the guidelines and tools developed to undertake integrated spatial plans for managing flood risks and water body restoration through nature-based solutions (NbS) |

**Output 1.2:** Pune Municipal Corporation (PMC) and Pune Smart City Development Corporation Limited (PSCDCL) and key stakeholders have access to knowledge, tools, and systems for data collection to undertake integrated spatial planning for compact development and low emission resilient green transit corridors. (**UNEP LED**)

The output supports PMC in addressing the key challenge of urban sprawl affected by increasing population and business as usual planning to accommodate the needs for additional land. The urban sprawl in turn has resulted in congestion and air pollution due to increased demand for travel mainly for work as well as loss of green spaces. This in turn has resulted in the heat island effect, decreased resilience of the city to climate change and increased GHG emissions. The output will support an integrated approach to urban land use and mobility planning building upon the TOD and FSI policy adopted by the city and make effective use of these policies to address the urban sprawl and related environmental challenges. The output will support densification around the existing planned Mass Rapid Transit System (MRTS) and Bus Rapid Transit System (BRTS) corridors.

The objective is to showcase the concept of TOD approach in the existing transit corridors where the PMC policy delineates TOD Station Areas (TSAs) with increased FSI. The new policy allows FSI upto 4 in the TOD areas. The TOD policy is applicable along the 55 KM metro corridor through ongoing projects. This is likely to increase in the future. The integrated planning of the area with the transit corridors will promote mixed-used planning, integrated with NMT infrastructure to enable development of a high-density zone with ease of access to transit stations through safe and easy movement in the TSAs. PMC plans to increase the current NMT infrastructure of 50 kms to 824 kms by 2030. The output will also integrate NbS to green the NMT infrastructure and increase green spaces in the TSAs. This will enable increased use of public transport and cycling/walking trips in the TSAs thus reducing congestion and GHG emissions by reducing use of private vehicles. To further reduce the GHG emissions from TSAs, the output will also support integrating in TSA planning process measures for low emission energy efficient buildings as well as integration of EV charging infrastructure.

The output will support coordination among relevant key city (e.g., PMC, PCMC, PSCDCL) and state (e.g., PMRDA, PMPML, Maha Metro) level government entities that have a role in planning and developing infrastructure in the TSAs through establishment of a Coordination Group (CG). The Coordination group will also include departments responsible for gender issues and inclusion of economically weaker sections (EWS). The CG will meet regularly to guide the work of all outputs, finalize deliverables under the outputs, and facilitate the integration of the deliverables into entities' respective planning and decision-making processes. The engagement of the entities through the CG will highlight the benefits of coordination among them as well as work as a tool for capacity building by hands-on training on integrated low emission resilient gender response and inclusive development.

The lessons learned and the process of coordination will be documented. The lessons learned will be adopted as good practice by entities in the CG and also provide a template for the state and city entities to promote a more integrated approach and sustainable approach on issues with overlapping mandates.

The output will support the Pan City Urban Development Plan (Smart City initiative) based on the principles of compact urban development through integrated Low emission green resilient transit corridor planning. The objective is to undertake an integrated planning of city and urban mobility to address the challenge of urban sprawl, reduce air pollution and GHG emissions from transport. The current development planning is based on the land needed for transport corridors to connect the different parts of the city and allocated as a residual function to the land allocation plan and the estimates for travel demand based on the land allocation. The current approach also doesn?t integrate the TOD policy into the local area development planning. The guideline will use the TOD principles and design of the transport network and become an integral part of the City Development Plan.

The guideline will include, inter alia:

> ?      methodology to assess the type and level of mixed development to be undertaken in different parts of the city;

> ?      the planning of transit corridors and public transport network based on the antecedent travel demand generation based on participatory planning practices and including women and vulnerable populations;

> ?      framing of the local area transport network to feed into the transit corridors to increase the use of public transport;

> ?      integration of NMT infrastructure into the local area transport network to reduce travel demand and increase access to public transport; and

> ?      integration of NbS to create green NMT and transit corridors, to establish charging infrastructure.

The guideline will also provide for strategies and measures to implement these approaches as identified through integrated transport and city development planning. The guidelines will also include methodology to consider the assessment of resilience of transit corridor infrastructure by assessing the impacts of climate change. The guidance will be integrated into the guidelines for city development plan and city mobility plans.

The project will support (output 2.2) PMC in developing integrated low emission resilient gender responsive and inclusive TSA plan. This output, based on the actual plan developed in output 2.2, supports development of guidelines for formulating TSA plans to the MRTS and BRTS corridors thus creating low emission resilient green transit corridors. The guideline will include a methodology to map the baseline for existing land use mix, transit modes, density,  assess the potential for densification based on carrying capacity of the area, ease of accessing transit stations in terms of NMT infrastructure, green spaces, as well as a gender assessment etc. The guideline will also include methodology for

assessing the GHG emissions for the TSA. Based on the baseline assessment, the guideline will include methodology to prepare a TSA plan for densification integrated with NMT infrastructure using NbS to increase the NMT trips and easy access to the transit stations. The methodology will also address development of EV charging infrastructure and measures to promote construction of energy efficient buildings and use of renewable energy. The guideline will include methodology to integrate economic housing for the weaker section (EWS)/Low-income housing (LIH) ensuring easy access to transit stations. The methodology will provide a framework to undertake sex-disaggregated data collection and assessment of sex-disaggregated benefits.

To address air pollution the Government of India has identified transformation to e-mobility as one of the key options. One key barrier to achieving widespread electric vehicle adoption is a lack of available charging infrastructure. Local governments have an important role to play in developing public and private electric vehicle charging infrastructure due to their authority over zoning, parking, building codes, and permitting and inspection processes. The output will support PMC in integrating charging infrastructure as part of the land use planning process.

The guideline will cover gathering data for undertaking planning ? existing charging infrastructure, charging behavior, future demand for charging based on electric vehicle goals, assessing mobility patterns to identify density of charging required, assessing potential sites for creating public/private charging infrastructure including grid suitability, etc. This guideline will also inform the design of charging infrastructure development around the low emission resilient green emission corridor as well as charging infrastructure in the Station TOD area. The guideline will also identify the measures such as streamline permitting, preferred EV parking policies, preferential charging for ride-hailing vehicles, zero-emission areas. The private sector will be specifically engaged ? fleet operators, enterprises (Shopping Malls, Private sector office buildings, etc.), EV charging infrastructure providers, utilities, etc. ? to seek the feedback as well as seeking investments in creating charging infrastructure. The guideline will also make recommendations to be included in the development of Master plan, TPS and TPAs.

The guidelines developed will be integrated into the city and state entities decision making processes as well as within the existing guidelines for planning and project development. The control measures identified in the guidelines developed will be integrated into the CDP-2041 and CMP-2008. This will ensure the uptake of the guidelines for application in the future. The coordination process too will be documented, and CG members will integrate these as best practices as part of their planning and project preparation process, so as future activities are undertaken through a more active coordination. Recommendations will also be developed and submitted to the State and City entities for institutionalizing the coordination, specially at the PMRDA which is the integrating institution for the Pune Municipal Region.

 To make the application of plans and guidelines effective, the output will support the strengthening of the existing ICCC by extending it to cover the necessary data required for planning low emission resilient green transit corridors. This will include geospatial information and datasets required for undertaking development of plans, such as, built -up area, densities, parking spaces, green spaces, land use categories, green buildings, FSI, NMT, BRTS, MRTS,  city buses (including EV), and EV infrastructure. The integration with ICCC will allow the use of existing digitized city maps that exist

and data from other sources used for management of the city. This will facilitate more integrated planning and management of the city. The platform will enable collection of new/updated data related to green corridors and TOD. A gender layer with focus on sex-disaggregated data and information on basic amenities, education, employment, transport, and safety concerns will also be created. Once these layers are integrated; these would be used to assess the capacity of the infrastructure and allow PMC to upgrade the necessary investments into urban infrastructure to facilitate TOD development and better plan EV charging infrastructure. The database will have a dashboard to capture indicators that allow it to assess the impact of integrated plans. The dashboard will also integrate indicators for GHG emissions, urban green space, as well indicator to assess sex-disaggregated impacts. The data-based design will be populated with the data collected as part of output 2.2 to support the design Station Area TOD. This will provide hands-on experience to the city authorities in collecting and populating the data on the platform. The platform will contain a user-friendly interface for the civil society, citizens and researchers, enabling them to provide inputs. The interface will also facilitate feedback from civil society to track satisfaction, identify problems, and improve urban planning processes. A protocol/manual will be developed as a user guide for maintaining and operating the database and dashboard created under the output.

The deliverables of the output will be through a consultative process with the government as well as non-government stakeholders. Government stakeholders are engaged though the CG. Non-governmental stakeholders will include city-based research/academic institutes, civil society organizations working in gender responsive and inclusive sustainable urban development space, private sector and associations of residents. Feedback will be sought through electronic means as well as regular consultation meetings will be held at critical stages of the deliverable's development. These consultation meetings will be aimed at receiving feedback, creating awareness, and also capacity building. Training material will be prepared for the guidelines and used as a basis of capacity building. YASHADA, the Station Institute of Urban Development that provides specialist training for urban functionaries, will be partnered in providing capacity building. YASHADA is accredited to NIUA, and will in partnership with NIUA provide training to other cities in the state (output 4.2).

| | | Deliverable |
|---|---|---|
| 1.2.1 | | Coordination group of Pune and Maharashtra government entities, with mandate in land use planning and zoning including development of infrastructure, established to guide the developments of deliverables and their validation |
| | a | Coordination group among Pune and Maharashtra government entities established |
| | b | Lessons learned on coordination documented and integrated into planning processes of participating Government entities |
| 1.2.2 | | Tools to support urban development policy makers for developing gender responsive and inclusive integrated plans for development of compact low emission resilient green transit corridors |

| | | |
|---|---|---|
| | a | Guideline for designing Compact and Low-emission Resilient Green transit corridor plan developed in consultation with the stakeholders, including gender considerations, and integrated with CMP (2008) and the CDP 2041 |
| | b | Planning guideline for formulating low-emission resilient gender responsive and inclusive Station TOD Area developed and adopted as a planning tool by PMC |
| | c | EV Ready city Guidelines for developing charging infrastructure developed and integrated in Urban Development planning processes |
| 1.2.3 | | Enhanced digital platform developed and integrated with ICCC |
| | a | Enhanced ICCC, including:<br><br>? Spatial infrastructure data (SID) based on standardized geospatial information generation processes, including links to national data systems.<br><br>? Georeferenced data for TOD areas and green corridors covering information on different assets.<br><br>? Indicator-based dashboard for analysing data related to TOD areas and green corridors for monitoring the implementation of plans and informing future planning.<br><br>? Gender information layer and gender analysis dashboard to facilitate inclusive planning.<br><br>? Enhanced user-friendly interface for internal and external users. |
| | b | User manual for updating the digital information and use of digital platform for planning. |
| 1.2.4 | | Capacity building of officials of Pune and Maharashtra government entities and other non-government key stakeholders on using the guidelines and platform for enabling sustainable, resilient, and gender responsive urban development planning. |
| 1.2.5 | | UrbanShift labs conducted for building capacity of members of the Coordination Group on integrated planning, innovative financing sources, and data strengthening for planning. |

**Output 1.3:** Surat Municipal Corporation (SMC), Surat Urban Development Authority (SUDA), and key stakeholders have access to knowledge, tools, and systems for data collection to undertake integrated spatial plans for resilient coastal zones and low emission mobility development. (UNEP Led).

The SMC area was expanded in the recent past to include the areas adjoining the coastal zone to meet the expanding land need for growing population. SMC has notified TPSs in the expanded area for designing the land area and allocating land for open spaces, social infrastructure, services, the road network, etc. A project is also planned, Dumas Sea-front Recreational project, at Dumas beach which is a popular tourism area. Surat beaches attract significant tourists from within and outside the state. This

is the first phase of the project, and it will be further extended. The total Dumas area is 20.577 sq. km and includes Mangroves and Forest areas. The urban development planning doesn?t consider the resilience aspects and thus the plans have no related development control regulations to ensure land use doesn?t increase the vulnerability of the area. SUDA planning applies the same development control regulations as for inland areas to permit development in the CRZII[12] zone and doesn?t consider its vulnerability from proximity to coastline. Coastal Zone Management Map for Surat was prepared in 2011 by National Institute of Sustainable Coastal Zone management which delineates the coastal area (500 m inland from High Tide Line (HTL). This is further divided into CRZI, II, and III[13]. CRZI allows eco-sensitive tourism to project coastal ecosystems, II allows for infrastructure development. The output will support integrated plan development of the Dumas Area, about 20 sq KM, to increase its resilience through protection of the coastal ecosystems. (mangroves, forests, etc.) The output will reduce flood risk by integrating NbS (detention pools, infiltration swales, green areas, etc.) to protect and augment the natural drainage systems in combination with the storm drainage systems in the area. The output will support the use of green spaces for recreation to enhance the ownership and value of conservation. The Output will also support integration of NMT infrastructure with green spaces to reduce the vehicular traffic in sensitive areas and connecting them with the public transport notes in Dumas and Khajod as well as proposed road network in the area.
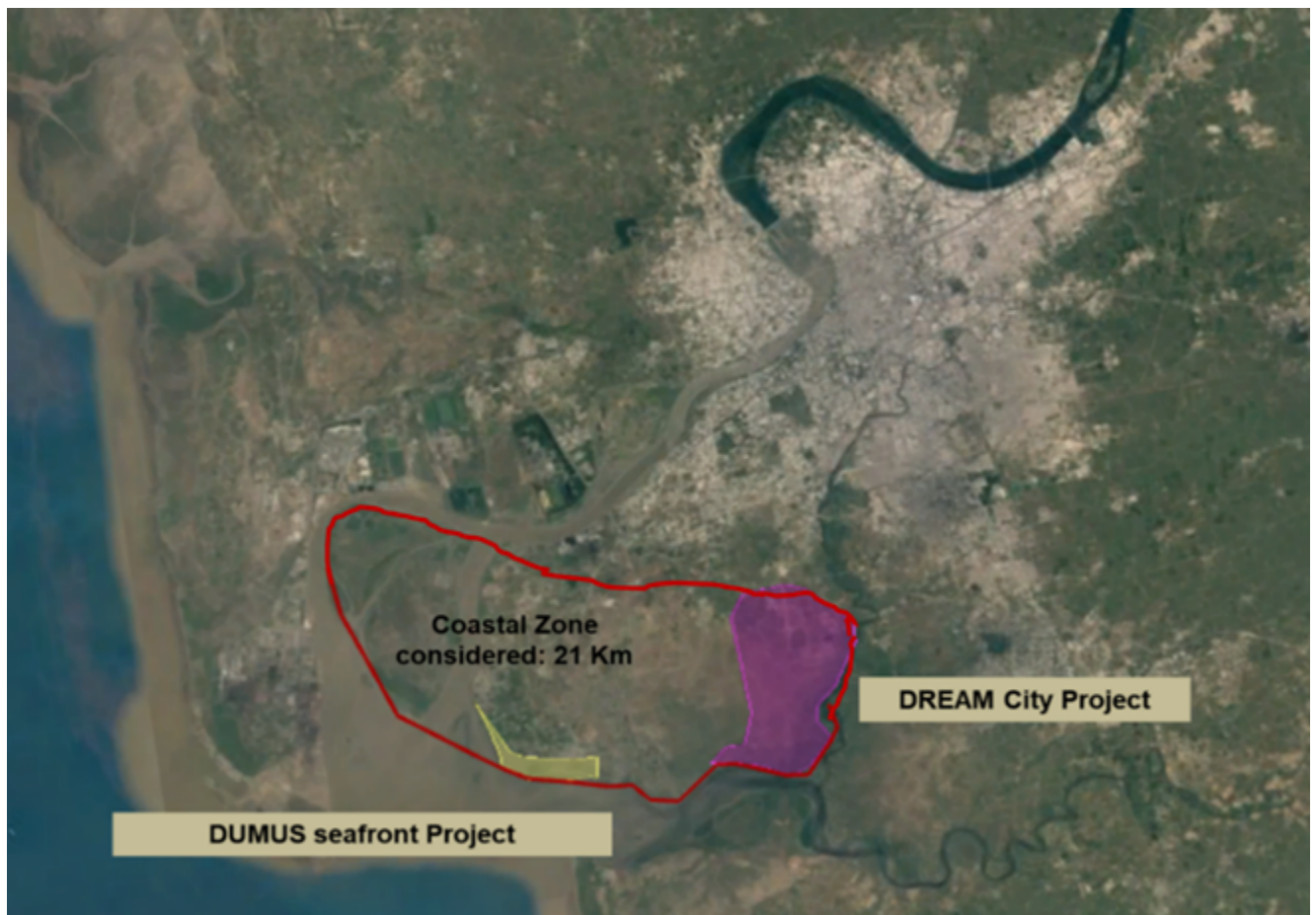


Figure 21: Project Intervention Area, Surat

To highlight the importance of considering the resilience and GHG emissions aspects in development and need for coordination among various entities, the output will support coordination among SMC (responsible for town planning and provision of services), SUDA (planning and development regulation) and other state entities ? GIDC, GPCB, Gujarat Coastal Development and Management Authority (GCDMA), Urban Development and Housing Department (UDHD), Forest Department, etc. through establishment of a Coordination Group (CG). The Coordination group will also include departments responsible for gender issues and inclusion of economically weaker sections (EWS). The CG will meet regularly to guide the work of all outputs, finalize deliverables under the outputs, and facilitate the integration of the deliverables into entities' respective planning and decision-making processes. The engagement of the entities through the CG will highlight the benefits of coordination among them as well as work as a tool of capacity building by hands-on training on development of plans and guidelines. The lessons learned and the process of coordination will be documented. The lessons learned will be adopted as good practice by entities in the CG and also provide a template for the state and city entities over issues with overlapping mandates to promote a more integrated approach and sustainable approach.

The output will support an integrated low emission development plan for Dumas Khajod through a participatory approach with SMC, SUDA and other relevant entities responsible for urban development in Surat. The development plan will integrate the protection and enhancement of coastal ecosystems (mangroves, forests, water bodies, etc.) using NbS in defining the land use pattern for the area. Development will also integrate the allocation of land for creating transport infrastructure including green NMT corridors to increase the public transport use to access the area and increased NMT trips within the area. The output will support mapping of the existing mangrove, forest, water bodies, natural drainage channels and other ecosystem/green areas. This will be overlaid with the sea level change scenarios and vulnerabilities from other weather events. The data for this be sourced from existing data sources where possible. The information will help analyze the areas of vulnerability and measures to reduce vulnerabilities through protection of existing mangroves, forests, water bodies, drainage channels as well as other measures (creation of detention pools, infiltration swales, NbS for maintaining natural drainage channels, etc.)

The output will also support development of low emission mobility for the area to reduce pressure on green spaces from increased demand for transport infrastructure. The Area is popular with Gujarat as a tourist sport and with development in the area likely to see increased visitation as road infrastructure is developed. Increases vehicular traffic will result in GHG emissions but also result with time in increased demand for roads and parking spaces. This will put pressure on the green spaces in the Area. The output will support greening the proposed road infrastructure to connect the Area as well as the road infrastructure including NMT in the Area. The emphasis will be on increasing the use of public transport by strengthening the NMT infrastructure, especially in the areas close to Dumas Beaches. The output will support assessment of developing NMT infrastructure integrated with green infrastructure created to increase resilience and protection of coastal zones. Also, the NMT will be planned as green corridors to provide a better user experience and develop interconnected green spaces. The Plan will also suggest measures to limit the access of motorized transport by integrating parking spaces with the public transport nodes and NMT infrastructure. Under the Plan development a base map of the area of the current road network delineating the availability and condition of NMT infrastructure will be

developed. The base information will be used to identify the gaps in NMT infrastructure vis a vis with the NMT guidelines of the Ministry of Housing and Urban Affairs. An overlay of the desired NMT network with focus on continuity, walkability, and universal accessibility as well as with the green spaces proposed for protection of coastal zones and resilience. The analysis will identify priority roads and corridors with ample green cover that facilitate the most direct route to Dumas Sea front from the public transport nodes.

The Plan will be integrated into the development process of the Area and TPSs in the Area through:

- developing land zoning based on above and development control measures to ensure development is line with above measures and integrating them Development Plan (2035).

- developing planning regulation for all the TPSs in the area to ensure the development is consistent with larger area plans and integrated with the TPSs finalization process.

- Measures to limit the access of motorized transport in sensitive zones of the Area recommended to the appropriate authority for recommendation.

Development of the Plan will be used to identify and propose mangrove and forest area conservation and enhancement plans for Smart City Funding. A guideline on low emission resilient integrated plan for coastal zone urban development will be developed based on the experience of the development of the Plan. This guideline will be adopted as a guideline for Urban Development Plans by the UDD for application to other coastal cities in Gujarat and India. Based on the green NMT plan development, a guideline for developing green NMT integrated with the green space/recreational spaces and enhancing access to public transport hubs will be developed. The NMT guideline will be integrated with the Comprehensive Mobility Plan (2046).

The output will complement the Plan development with development of a geo-reference database integrated with the ICCD to enable SMC to monitor and under-take evidence-based planning to enhance resilience of coastal zones and develop green transport infrastructure including green NMT. The project will support the development of geospatial maps to capture the data on biodiversity and green spaces as well as transport infrastructure including NMT for Dumas-Khajod area. This will cover:

o Coastal ecosystems (mangroves, dunes, beaches, wetlands), green spaces, natural drainage channels and water bodies, etc;

o Built infrastructure ? buildings (residential, schools, commercial), healthcare infrastructure, energy infrastructure, industrial infrastructure, waste management infrastructure, etc; and

o Transport infrastructure ? roads, public transport routes (bus services, BRTS, MRTS, etc), parking spaces, NMT, EV Charging infrastructure, etc.

A geo-referenced database of vulnerabilities from flooding and sea level rise will be prepared for the Area. This will be regularly updated based on the assessment of climate change scenarios. The exiting databases at state or national level will be connected to the city database. The database on a GIS map

will allow spatial visualization of the assets against the vulnerability maps, assess the vulnerability of assets and related financial damages, planning of new infrastructure projects integrating resilience measures in the design based on vulnerability of area. The possibility of integrating the development regulation controls with the geo-referenced data will be explored. This will allow confirming the permitted use of land as per the plans as well as monitor the developments to ensure they are aligned with the plans.

To enable better transport infrastructure planning, a data collection system will be designed covering the following data: built up density, FSI, offices, residential areas, EV charging points, etc. to assess the travel demand patterns; and, mobility and accessibility data ? modal shares, travel times, speed, public transport use. The data will be sex disaggregated. Data on safety and accessibility of NMT and public transport will also be collected. The data set on travel and related infrastructure could be used for planning public transport as well as augmenting mobility services and infrastructure. The database could also be used to assess the GHG emissions and air pollution loading from the travel patterns. The database developed will be integrated with the ICCC platform. This will enable use of the geo-referenced data already created in the ICCC system and add the missing information layers for better low-emission resilience integrated planning. A protocol will be prepared for collecting and storing data, entry of data by various agencies, responsibility for data collection, and for use of the data for analysis. This will also help SMC to collect data are assess its progress using the Climate Smart City Assessment Framework developed by the MoHUA, specifically two sectors ? Urban Planning, Biodiversity, and Green Cover; and, Mobility and Air.

The database will also provide input possibilities for non-government entities for providing identified categories of information that could help with the maintenance and better management of the city. In line with the Open Data Policy of India which facilitates open access to shareable data along with its usage, the ICCC platform will be linked to Open Government Data (OGD) Platform of India so that it can act as a mechanism for citizen engagement and for data led planning.

The deliverables of the output will be through a consultative process with the government as well as non-government stakeholders. Government stakeholders are engaged though the CG. Non-governmental stakeholders will include city-based research/academic institutes, civil society organizations working in gender responsive and inclusive sustainable urban development space, private sector, and associations of residents. Feedback will be sought through electronic means as well as regular consultation meetings will be held at critical stages of the deliverable?s development. These consultation meetings will be aimed at receiving feedback, creating awareness, and also capacity building. Training material will be prepared for the guidelines and used as a basis of capacity building. GUDI, the State Institute of Urban Development that provides specialist training for urban functionaries, will be partnered in providing capacity building. GUDI is accredited to NIUA and will in partnership with NIUA provide training to other cities in the state (output 4.2).

| | Deliverable |
| --- | --- |

| 1.3.1 | | Coordination group of Surat and Gujarat government entities with mandate in planning and development of Coastal zone areas, including transport authorities, established to guide the development of deliverables and their validation |
|---|---|---|
| | a | Coordination group of Surat and Gujarat government entities established |
| | b | Good Practice guidance on development coordination prepared and integrated into the planning and infrastructure development processes of authorities operational in SMC jurisdiction |
| 1.3.2 | | Tools to support integrated plans for resilient coastal zone development using NbS and low emission mobility |
| | a | Low emission resilient development plan for Dumas coastal zone (LERDP-DCZ) and Khajod area, including related development control regulations for CZ, integrated with the Development Plan (2035) and Mobility Plan (2046) |
| | b | Guidelines for City and State entities to prepare low emission resilient coastal zone development plans for conservation of natural ecosystems in coastal zone, including NbS, developed and integrated into the planning processes of SUDA and SMC |
| | c | Guideline for NMT policy, including integration of green spaces, are developed and integrated with the Comprehensive Mobility Plan (2046) |
| 1.3.3 | | Enhanced digital platform developed and integrated with ICCC |
| | a | Digitized data framework to monitor and support low-emission resilient coastal zone development integrated with ICCC<br><br>- Indicators for monitoring the plan implementation<br><br>- Digitized maps and database of climate hazards and vulnerabilities Gender layer and gender analysis dashboard created to track gender disaggregated benefits and impacts of development planning<br><br>- Enhanced user-friendly interface through Open Governance Data (OGD) for government agencies and citizen |
| | b | User manual for updating the digital information and use of digital platform for planning |
| 1.3.4 | | Capacity-building program for government officials and other key stakeholders on applying the guidelines and developing and collecting data, both spatial and aspatial and resilient planning |
| 1.3.5 | | UrbanShift labs conducted for building capacity of members of the Coordination Group |

**Component 2 ?** Investments in low emission, resilient and nature-based solutions

*Outcome 2: Key stakeholders in target cities apply tools, knowledge and experiences to develop sustainable investment projects for low-emission resilient Urban development*

The component will support the demonstration of pilot projects in the three primary target cities on designing and implementing sustainable infrastructure projects to address the challenges faced by the cities. The pilots are built on the identified urban development priorities and will adopt / support approaches which use NbS, result in lower GHG emissions, avoid degradation of land or loss of biodiversity and ecosystems services. These investments are the basis of work and inform the integrated planning process under component 1. The demonstration projects will also form the basis for developing financial instruments and business models to engage the private sector under component 3. All experiences from the demonstrations will be used to support replication and scaling up through-out the country through component 4.

In Chennai the GEF investments will support demonstration of NbS for restoration of the Kadapakkam Lake in North Chennai, one of the major water bodies in GCC boundary areas and within the Kosasthalaiyar Basin area. GCC has identified this lake for restoration by studying the basin and catchment area interventions for water recharging and retaining the lake area from future encroachments, in line with the principles/frameworks being advanced for NbS.

In Pune the GEF investments will support demonstration of Gender responsive Station area TOD plan for selected Station area in TOD corridor for implementing solutions to develop connected urban green spaces with NMT network, electric vehicle infrastructure provisions and mandatory green building certification for new constructions. This will enable the PMC and other public agencies (such as PMRDA, PMPML, PCMC, PSCDCL etc.) to draw linkages between various initiatives and bring convergence on various projects for developing green corridors.

In Surat the GEF investment will support demonstration of the economic and environmental benefits through implementation of Dumas Seafront Development project. Through this intervention, SMC will catalogue the experiences of implementing low-carbon, nature-based solutions such as NMT infrastructure, green corridors which will act as lung spaces and sponge spaces. The lessons and good practices from this pilot project will be scaled up to implement the various proposals of the Development Plan (2035) and City Mobility Plan (2046).

The component will address one of the challenges of limited local examples and practical, hands-on experience with integrated, innovative and sustainable solutions that demonstrate multiple local and global benefits. The demonstration projects will apply the knowledge and tools developed under component 1 to an actual investment thus providing a first- hand experience to urban development stakeholders of integrated solutions for addressing urban challenges. Further, the demonstration project will also provide a platform for developing innovative and sustainable financing options to address Insufficient finance available to implement sustainable urban investments at scale. The practical examples will help the stakeholders in replicating the knowledge and applying it to other development projects in the primary target cities. Further, these experiences will be documented and shared with both replication city and other cities through the work under component 4, thus providing the necessary best practices to urban stakeholders across India to apply these solutions in their context. Thus, through component 2 and propagation of experience through component 4 will enable urban development stakeholders and authorities to develop low-carbon and nature-based solutions for urban sustainable development

**Output 2.1:** GCC has knowledge and experience to design sustainable investment projects using NbS for low-emission resilient development. (**ADB Led**)

The Output features an infrastructure investment project which will support integrated flood risk management across Chennai-Kosasthalaiyar River Basin, construction of pumping stations and catch-pits for water retention, and recharging of groundwater aquifers.  It will also support a NbS investment in an identified water body, Lake Kadapakkam, in north Chennai.  The Lake Kadappakam investment will serve as demonstration of how to apply NbS to secure multiple benefits, including water retention through the ?sponge cities? approach, as well as other regulating, provisioning and cultural services.



*Current View*                                    *Proposed View after Intervention*
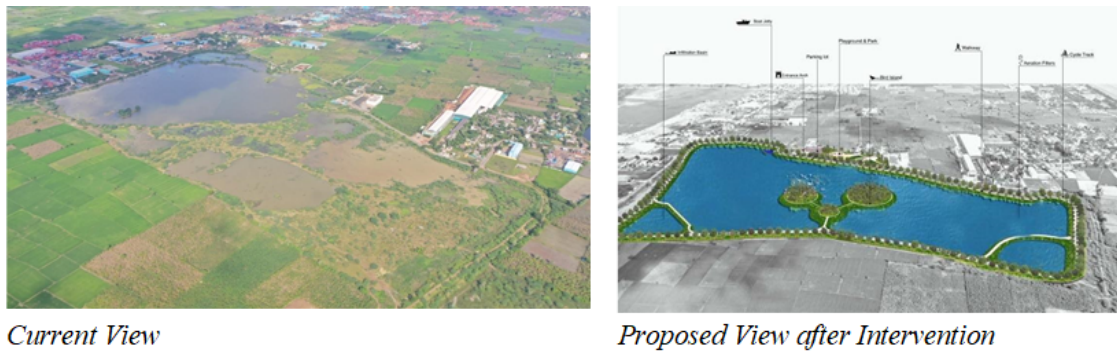
Figure 22: LAKE KADAPAKKAM TODAY (LEFT) AND CONCEPTUAL VIEW OF LAKE KADAPAKKAM DEVELOPMENT (RIGHT)

The rejuvenation of the lake involves deepening of the lakebed and improvement of the inlet and outlet channels to the lake. The latter will improve the linkage and connectivity with the other water bodies and help in regulating the flow. The base material for creation of the bund will be the soil that is desilted from the water body. This will reduce the use of material and reduce transport related emissions ferried by this material. Bund slope will be gentle as 1:2, and a wider bund with clay core inside will increase the stability. The bund slope will be restrained using geotextile material, deep-rooted perennials and grasses. This will prevent the slumping and destabilization of the bund and further reduce erosion and improve sustainability. Gullies will be provided at periodic intervals in the bund to facilitate the flow of water during the rainy season.  Another key element will be the use of fly-ash, that will be used in the construction of pathways and other amenities. The use of fly-ash paver blocks and grass pavers will help reuse the material and improve the percolation of water into the ground in all the walkways and amenity areas.

The output will support creation of a 5 ha forested island using the Miyawaki Method to improve biodiversity, as it aims to provide a resting ecosystem for migratory birds of the Central Asian Flyway complementing the primary wetland of Pallikaranai and Vedanthangal. There will be short planting distances between the various native trees, plants, shrubs so that the flora will receive ample sunlight which leads to higher growth, contributes to almost 30 times plantation density, grows ten times faster,

and becomes maintenance-free after a span of three years. Perforators, water retainers, fertilizers are mixed with existing soil and act as a medium for vegetation. The landscaping surrounding the lake will be undertaken with native species to increase the biodiversity conservation and sustainability of a balanced ecosystem. The species used will be undertaken based on key biodiversity assessment (KBA) for the lake and surrounding area, including the biodiversity study done as part of preparatory analysis and the recommendation of the Green Cover study done by Greater Chennai Corporation.

The output will also support implementation of micro-compost structures for composting the garden waste and waste generated from human activities and build up a number of recreational areas for use by citizens in and around the lake area. To ensure sustainability, an ?Environmental Management Plan? will be developed for implementation by the Lake Management Committee (LMC) composed of government and non-government stakeholders, which will be set up during the implementation.



Figure 23: ARTIST IMAGERY OF PROPOSED CYCLE TRACK

To increase the ownership of the water body by the community, facilities for recreation such as the children's park and play field, outdoor play equipment, open lawn, sculpture using recycled materials, open-air theatre and skating ground areas will be developed for the local population. This will also include a pathway for recreation walking and cycle track with shaded trees and shaded seating. Fly-ash based construction materials shall be used for the construction of all the amenities. Most of the

furniture in the parks will be gabion design using material from within the project site and other eco-friendly materials. Visibility and accessibility to all age groups makes it a safe public space.

To ensure long term sustainability of the project, stakeholders including end-users and local community will be engaged through, both, consultation process while implementing the restoration project and regular communications through multimedia techniques. Eco-clubs and other CSOs working with school and local communities will be strongly involved in these activities. A range of information, education, and communication (IEC) activities will be undertaken such as meetings, distribution of awareness material such as posters and pamphlets, and public events to create awareness. Community members will be involved in preparing and designing the IEC materials. The IEC activities will be carried out through the LMC. IEC will also include training of local community members/local school children for conducting walks for citizens to make them aware about the lake?s ecosystem and the benefits of the lake to surrounding community. A knowledge, communications and learning specialist will be engaged for this effort.

|       | Deliverable |
|-------|-------------|
| 2.1.1 | Urban flood prevention, management and resilience enhanced for 1.9 million residents within the Chennai-Kosasthalaiyar River Basin (ADB-GCC co-finance) |
| 2.1.2 | Lake Kadapakkam water body restoration and public recreation area established through nature-based approach (GEF funded) |
| 2.1.3 | Knowledge, communications and learning advanced for local communities and government bodies (GEF funded) |

**Output 2.2:** PMC has knowledge and experience in developing and implementing sustainable low emission resilient green transit corridor investments. (**UNEP LED**)

This output will support Pune and Maharashtra government stakeholders with a mandate in Pune Metropolitan Area to develop integrated sustainable urban investment projects. Specifically, the output will support the following:

(i)        design integrated low-emission resilient TSA[14] plan for a Station in University ? Pashan-Sus link of the MRTS network.

(ii)        Develop an investment plan for creating EV charging infrastructure and pilot green NMT within the pilot Station Area TOD.

The development of a plan for pilot SAT will demonstrate the application of planning guidelines developed under Output 1.2. The plan development will demonstrate solutions to reduce GHG emissions, resilience, and livability of the pilot TSA as well as integrate measures to make the development gender responsive and inclusive. The Plan will also demonstrate solutions to increase the accessibility of public transport hubs and movability within the pilot TSA through enhancement of

NMT infrastructure integrated with the urban green spaces. To facilitate transformation to e-mobility the Plan will include integration of charging infrastructure.
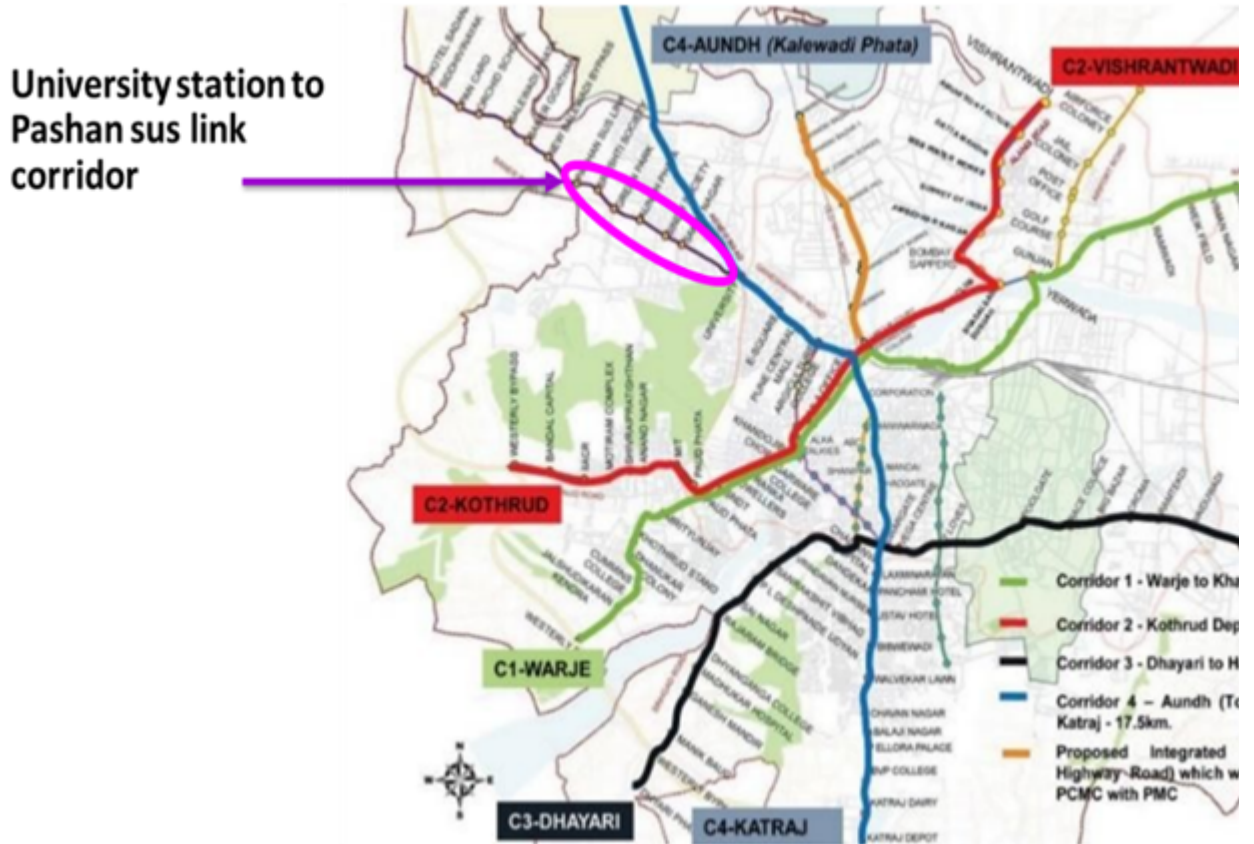


Figure 23: Project Intervention area, pune

The output will support undertaking analysis of identified station TOD area for:

? Assessing the densification potential at plot level;

? Assessing area under public use (roads and green areas);

? Assessing the infrastructure capacity required to manage densification of the station area; and,

? Undertake survey of the TSA population living and working in the area to assess sex-disaggregated information on livability of the area.

The analysis will help the urban planners to identify opportunities within the TOD station area:

? Improve street network and walkability through design and accessibility to public transport hubs and other social and commercial centres.

? Increasing area under public domain (NMT pathways and green spaces)

? Identify options to upgrade building bylaws complimenting the green corridor.

? Make the development more gender responsive and inclusive.

Based on the Plan, an investment project for piloting an NMT pathway integrated with the green spaces and increasing green cover, and EV charging infrastructure will be developed. The investment proposal, along with socio-economic benefit analysis of the investment (undertaken in Output 3.3), will be used to engage with the private sector in promoting the PPP model (undertaken in Output 3.3) to complement the GEF funds and the PMC co-finance for establishing the EV charging infrastructure. The plan will also help identify other investment projects to demonstrate the planning approach. The output will support development of concepts for the investments projects identified and facilitate investments including through private sector participation.

The development of the Plan and the Investment project will be undertaken through the CG (established in Output 1.2). The local community representatives, private sector operational in the pilot TSA will also be included in the CG for developing this output. To increase the ownership of the pilot, awareness raising would be undertaken with the community stakeholders as well as the private sector. The communication material will include socio-economic and environmental benefits of the pilot investment. The Plan development and preparation of investment proposals will enable provide opportunity for the urban planners to build capacity in using new tools and approaches for integrated planning. The analysis and other products developed in the output will be used to develop capacity building modules. These will be used to build the capacity of the CG group and other relevant stakeholders. These materials will also be used as part of Component 4 to undertake wider capacity building. The output is also expected to enable the PMC and other entities (such as PMRDA, PMPML, PCMC, PSCDCL etc.) to identify complementarity in their investment plans and pool resources to increase the benefits of their individual investment plans.

|  | Deliverable |
|---|---|
| 2.2.1 | Carrying capacity analysis for selected TOD area including detailed data on land use, built-up area, population density, roads, green spaces, green buildings, public transport nodes, economic activities such as market spaces, offices; health infrastructure, institution etc. Including, concepts for investment projects to demonstrate the planning approach |
| 2.2.2 | Low-emission Resilient Green Station TOD Area Plan for selected Station (based on planning guidelines developed under Output 1.2) including green NMT paths, integrated green spaces, and EV Charging infrastructure |
| 2.2.3 | Pilot demonstration of green NMT and EV Charging infrastructure based on Station TOD Area Plan |
| 2.2.4 | Revised Guidelines (developed under output 1.2) for Station TOD Area planning based on the lessons learnt from applied solutions and coordination in selected Station TOD Area. |

**Output 2.3:** SMC has knowledge and experience of developing and implementing integrated resilient coastal zone development using NbS and low-emission mobility solutions. (UNEP-Led)

The output will support the Surat and Gujarat government entities responsible for development in the coastal zone area application of the approaches for low-emission resilient green coastal zone development to the lowest unit of planning, the TPS, which is adjacent to Dumas Sea Front recreational and eco-tourism area. This area, on 100.06 hectares of land, will include sport facilities and amenities, exhibition halls, etc. It also proposes to construct a coastal road/bund/retaining wall to mitigate the force of sea waves and provide parking for two wheelers and four wheelers within the project area. The output will develop investment projects for integrating NbS measures in Dumas Sea Front project and low emission mobility integrated with TPS 80 and 81 to reduce the impacts of vehicular traffic on fragile coastal ecosystems (Figure 26 Dumas location is the location of the two TPSs).

The output will support demonstration of applying the LERD-CZ plan, developed as part of output 1.3, to develop the town plans for TPS 80 and 81. These two TPS schemes have been notified for development as the area has been brought within the jurisdiction of the SMC. The TPS will undertake development as per the current DRCs to ensure that the development is regulated. Most of the area fall under either Coastal Regulation Zones (CRZ) ? IB and II categories.[15] The CRZ regulations allow activities such as land reclamation for public purposes and other infrastructure projects in CRZ ? IB areas. In CRZ-II, construction of buildings for various uses; tourism facilities on the beachside are permitted. Thus, as per the law the TPS 80 and 81, which falls in CRZII zone, will be permitted to develop as per the DRCs of Surat in same way as any TPS in the interior of Surat. This will not take account its location close to the coastal zone. This area is close to the coastal zone and will be vulnerable to tidal waves and also anticipated sea level rise. The current TPS planning processes doesn?t consider these accepts. The GEF project will support integration of the climate vulnerability aspects into the TPS development and enhance the resilience.

The GEF support will focus on identification of options to protect the mangrove forests within the CRZ area that also act as mitigation measures to climate vulnerability. The GEF project will also integrate NbS into build infrastructure for the area as well as protect sensitive green spaces that also enable mitigating the risk of flooding. The output will support identification of NbS through assessment of opportunities for restoration of natural spaces (mangrove forests etc.) and include sustainability of natural ecosystems at the centre of the eco-tourism. This output will support identification and development of list of investment projects to demonstrate the planning approach. Output will provide support the development of concepts for these investments plans to seek financing for implementation.

The development in TPS 80 and 81 is likely to increase the population density and mobility in the area. The Dumas Sea front recreational/eco-tourism project is likely to boost the commercial activities. The Diamond city project is being developed in the vicinity of the TPS 80 and 81. The TPS development will be coordinated with the development in adjoining areas specially to reduce the use of motorized private transport through integration of NMT with enhanced public transport access to these areas. The output will support development of plan to connect proposed transport nodes at Dumas, Airport & Khajod (see Figure 25) to the seafront project and other natural recreational facilities through creation of NMT infrastructure that is integrated with the green infrastructure (connected green pathways etc) developed as part of Town Planning Schemes 80 and 81.
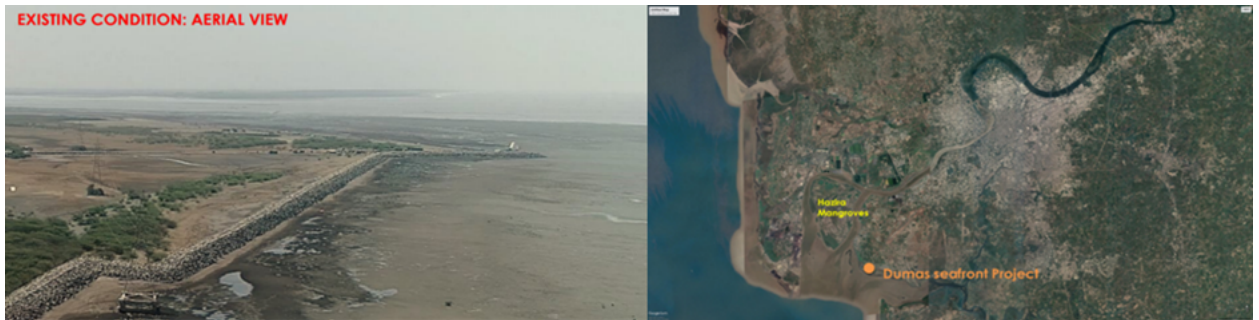
Figure 25: LOCATION AND SITE CONDITIONS OF DUMAS SEAFRONT PROJECT

The output will support an integrated assessment of the Dumas Seafront recreational and eco-tourism project to increase the use of NbS in development of infrastructure and resilience to current and future vulnerabilities from flooding. Alternative nature-based solutions to the activities proposed at Dumas Seafront project (e.g., permeable pavers for pathways and roads; bioswales for storm water drainage)  will be identified and integrated with the Dumas Sea-front recreational/eco-tourism project. Opportunities will also be identified for reducing the GHG emissions from the built environment.   The Dumas Seafront project will be extended through phase II and phase III. The output will undertake analysis and recommend measures for protection of mangrove forests within the CRZ area in Phase II and Phase III of the development  A public bike sharing scheme (PBS) will be developed to enable use of bikes by visitors to access the facilities from the nearest transportation hub. The work will build upon the best practices developed by various agencies such as C40/CFF and UN Habitat.



Figure 26: PROPOSED MASTER PLAN FOR DUMAS SEAFRONT PROJECT

The lessons and findings from this demonstration project will we captured and will be used to update the guidelines and plans developed under Output 1.3. This will also be used to dovetail nature-based solutions into the coastal development regulations. The lessons learned from the demonstrated project will generate valuable lessons and will be disseminated for replication for the protection of remaining coastal area in Surat and Gujarat (1600kms of coastline) and as well as other cities in India. These replication lessons will be shared with other agencies in the city and other cities in the country using the integration of digitized data layers for coastal zone development and management in the ICCC platform under output 1.3 and outcome 4 respectively.

The project will assess the gender responsible measures as part of the green NMT infrastructure development. This will include measures such as creating unobstructed and safe sidewalks, natural and night lighting solution combos for ensuring safety, etc. Further, the TPS 80 and 81 plans will also consider measures such as mixed use land planning to facilitate women?s care work and promote women?s employment options. These measures will be integrated with the pilot on green NMT, PBS and Dumas Seafront projects.

The output will be developed with the guidance of the Coordination Group established for Surat. This will support the objective of the project to emphasize the need of coordination in planning and project implementation among various state and urban authorities. The output will also be developed with feedback from non-government stakeholders through consultation meetings and seeking more targeted review from identified civil society organizations, urban practitioners working on Surat sustainable development issues and gender-based organization. Private sector actors, especially those part of providing services either for construction or operation of the Dumas Sea front recreational/eco-tourism project, will be actively engaged in consultation on design of the measures as well as seek their participation in the project implementation, especially green NMT corridors and development of last mile connectivity through use of bikes.

The output will undertake capacity building and awareness raising for stakeholders including the local community associations, private sector providing services in the zone and having business, private sector engaged in the development of projects in the coastal zone area as well as leading research organizations. The objective will be to highlight the importance of low emission resilient green development from both economic and hazard risk reduction perspective.

|  | Deliverable |
|---|---|
| 2.3.1 | Integrated Low-emission resilient Plan developed for Town Planning Schemes (TPS) no 80 and 81 (based on Dumas and Khajod Coastal Area Plan (Output 1.2)) with focus on NbS solutions to create built infrastructure and enhancement of mangroves, mudflats, and other coast ecosystems. And, list of investment project concepts developed and access to finance is facilitated. |

| | |
|---|---|
| 2.3.2 | Design of Pilot schemes to showcase use of NbS:<br><br>?    3.2 KM Pilot NMT corridor and Public Bike Sharing (PBS) initiatives at Dumas connecting with public transport hub at TPS no 80 and 81<br><br>?    Nature based solutions for creating infrastructure integrated with Dumas Sea Front recreational and eco-tourism project |
| 2.3.3 | Plan and Guidelines developed in Output 1.3 updated with lessons learned from deliverables 2.3.1 and 2.3.2 |
| 2.3.4 | Capacity building and awareness raising for city/coastal stakeholders on nature based, low-carbon, resilient development solutions |

**Component 3 ? Innovative financing solutions for cities**

*Outcome 3: Target cities increasingly adopt innovative financing solutions and business models to scale up green urban solutions*

The Component will cover the following

(i)      Support to the replication cities based on the learning and experience of primary target cities

(ii)      Demonstrating the use of innovative financing solutions and business models built around the demonstration projects implemented through component 2.  This will also address one of the main challenges faced by urban authorities ?Lack of local investment options for financing the implementation of integrated urban plans and actions?.

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[1] https://main.mohfw.gov.in/sites/default/files/Population%20Projection%20Report%202011-2036%20-%20upload_compressed_0.pdf

[2] P Mendiratta & S Gedam, Assessment of urban growth dynamics in Mumbai Metropolitan Region, India using object-based image analysis for medium-resolution data, Volume 98, September 2018, Pages 110-120, Applied Geography

[3] http://wgbis.ces.iisc.ernet.in/energy/paper/GHG_footprint/discussion.html (last excessed 21st September 2021)

[4] India?s Hotspots: The Impact of Temperature and Precipitation Changes on Living Standards. https://openknowledge.worldbank.org/bitstream/handle/10986/28723/India%20Country%20Snapshot.pdf?sequence=7&isAllowed=y

[5] https://wri-india.org/blog/urban-india-going-underwater-again

[6] https://www.bloomberg.com/news/articles/2019-08-23/urban-heat-islands-and-heat-waves-a-deadly-mix

[7] https://www.ijser.org/researchpaper/Dynamics-of-Peri-Urban-areas-of-Indian-Cities.pdf

[8] http://home.iitk.ac.in/~anubha/H7.pdf (accessed on 21st September 2021)

[9] Health and economic impact of air pollution in the states of India: the Global Burden of Disease Study 2019. https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(20)30298-9/fulltext

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[1] Sanyal, B. and C. Deuskar, ?A better way to grow? Town planning schemes as a hybrid land readjustment process in Ahmedabad, India?, https://www.researchgate.net/publication/285277544_A_better_way_to_grow_Town_planning_schemes_as_a_hybrid_land_readjustment_process_in_Ahmedabad_India

[2] Meshram, D. S. (2006). Interface between city development plans and master plans. ITPI Journal, 3(2), 1-9. http://www.itpi.org.in/pdfs/07_01.pdf

In Chennai, under this component the project will support the business case for investing in NbS over other competing priorities. Conventional business models and return-on-investment for NbS are not fully developed and there appear to be limited opportunities for the private sector. Studies show that almost 75% of NbS are funded from public sources (public budget / direct funding or subsidies).

In Pune, the Component 3 aims to support the development of financing approaches leveraging the FSI policy and business models to engage the private sector in integrated sustainable development of the TOD area. The component will support the urban stakeholders in developing an Urban Transport Fund (UTF) based on land value capture and other financing sources and PPP model for financing green corridor elements.

In Surat, the project will support creation of business models and innovative financing instruments for replicating the tried and tested sustainable interventions and also creating framework for disaster risk financing for the Surat City Region. For the Dumas Seafront Development, business models and innovative financial models will be devised for creation of NMT infrastructure, Public Bike Sharing etc. These business models and financial instruments will be used for scaling up of nature-based solutions designed at Component 2 and will be aligned with the integrated Urban Development plan prepared at Component 1.

**Output 3.1:** City authorities in replication cities have tools, experience, sustainable investment framework based on demonstration work in main target cities (e.g., Agra and Puducherry (UNEP led), and Madurai (ADB led))

Chennai will be twinned with Madurai, a city in south central Tamil Nadu, prone to extreme weather, the intensity of which has only been exacerbated by climate change. On the one hand, there is a severe drought, and on the other, there is excess rainfall. These are caused or exacerbated by unsustainable land use patterns, excessive demand for water, insufficient maintenance of water bodies, and unclear or conflicting policies. In Madurai, project activities will be undertaken by Madurai Corporation in close collaboration with the GCC and Government of Tamil Nadu. Support will be provided to the Madurai Corporation to learn from the NbS experience, strengthen institutional capacity for integrated water resources management through participation in national and global platform activities. The intervention will also include local stakeholder consultations on possible NbS intervention in the city and support pre-feasibility and due diligence for an investment roadmap, which will identify potential ?nature positive? projects for the city.

The Investment Readiness Roadmap for Madurai will (i) explore the various components and create a framework for NbS Solutions for water body restorations. (ii) The activity will consider a complete lifecycle estimation of the cost and materials involved to measure the sustainability of NbS investment. and (iii) will help create a business case based on the learning from the Green Infrastructure manual that will be prepared for the primary city.

The Investment Readiness Roadmap specific to Madurai that will explore alternative financing for NbS restorations of water bodies in Madurai. The alternative financing models will include and explore finances from the private sector including but not limited to PPP funding, CSR funding, Business Continuity Planning Funding, Risk Mitigation funding etc.

All the knowledge products, tools and good practices will also be shared with all the relevant stakeholders in Madurai. Madurai will be actively engaged and will also play a very collaborative role in creation of these products and tools. City officials and other stakeholders in Madurai will also be able to participate in UrbanShift activities. Support will be provided to Madurai city to learn from relevant NbS experience, strengthen institutional capacity for integrated water resources management through web platforms & other knowledge platforms and tools. Madurai will be encouraged to participate in all the activities planned for the primary cities including capacity building, national dialogues etc. Madurai will be encouraged to increase its ambition in sustainable development specifically in NbS investments. Madurai will also be part of network which will either collaborate, consume and co-create training modules on sustainable urban planning, urban finance, climate resilience, etc.

Pune will be twinned with Agra, a city in Uttar Pradesh, which is a tourist destination and is one of the Smart City Mission identified cities. The city is also an economic hub. As part of its efforts to develop as a sustainable inclusive ity, one of the key areas of work focused on is improving mobility, especially through the public transport network. A key project in this direction is developing the metro network. The city will be provided support based on experience and work in Pune to develop the Metro corridors as low-emission, resilient green transit corridors. In Agra, project activities will be undertaken by Agra Municipal Corporation (AMC) in close collaboration with the Pune Smart City Authority and MoHUA.

Agra has proposed adoption of TOD principles and intends to improve access to public transit and last mile connectivity infrastructure. However, due to lack of any comprehensive TOD policy of Agra city

or the state of Uttar Pradesh, they have not even identified any public transit corridors or stops. Under the GEF funding, Agra has proposed to receive support on the ongoing TOD interventions, NMT interventions in Taj Mahal vicinity- Taj Ganj and initiatives for TOD zone around Taj mahal metro station. Agra city will undertake following activities:

? Formulate Station area plan for Taj Mahal metro station TOD zone.

? Design a pilot project to improve last mile connectivity & pedestrian infrastructure in the zone.

Based on the experience and work undertake for Pune, the TOD policy will be developed for Agra based on Pune experience. The Pune stakeholders will participate in the training workshops organized for Pune stakeholders. The Agra city planners will also work with the Pune city planners in undertaking this work, to ensure peer-to-peer learning.

Surat will be twinned with Puducherry, a union territory in south India. It is spread in four regions: Puducherry and Karaikal in Tamil Nadu, Yanam in Andhra Pradesh, and Mahe in Kerala, It is located on the coast and is a rapidly growing urban area. It is also a tourist site for national and international tourists. Puducherry?s vision is to ?Transforming Puducherry into a global tourism destination by leveraging its heritage, cultural, spiritual and educational advantages. Enhance the quality of life of the citizens by providing efficient urban mobility, smart civic infrastructure, smart service delivery and participative decision making.?

Puducherry Government is in process of developing Comprehensive development Plan (CDP) for the three regions of Karaikal, Yanam and Mahe. The Government of Puducherry has proposed to leverage the funds from GEF for the technical support for the preparation of CDP for Karaikal, Mahe and Yanam to anchor the principles of carbon neutrality in the CDP. The technical support would be provided. Also, the GEF funds would also provide technical support in developing a strategy document for low carbon interventions along with its implementation plan, financial priority, and sources.

The CDP will benefit from the Low emission resilient coastal zone development guidelines and plan developed for Surat. Puducherry, like Surat, is a coastal tourist place for national tourists. Also the development in Puducherry is within the coastal areas. Thus the experience of Surat will be used to ensure CDP is developed to enhance resilience of coastal areas and protection of coast ecosystem through NbS measures. Through the GEF support, the Puducherry Government would also like to develop a pilot project in the region of Mahe for operationalizing the strategies as indicated in CDP and the strategy document. Capacity building of the officials would be also carried during the preparation of strategy document and its implementation.

Further, detailing of the work will be undertaken after the project is initiated with the target cities during implementation.

|  | Deliverable |
|---|---|
| 3.1.1 | TA provide to Madurai on NbS based solutions for rejuvenating water bodies and integrating them into the City Flood Management system |

| 3.1.2 | Station Area TOD Plan for Taj Mahal Metro Station and design of pilot projects to enhance last mile connectivity to the Taj Mahal Metro Station, including improved pedestrian infrastructure |
|---|---|
| 3.1.3 | CDP for Karikal, Mahe and Yanam, including coastal development to enhance resilience through coast ecosystem protection using NbS measures, and pilots designed to implement identified options in the CDP. |

**Output 3.2:** GCC has innovative financing solutions and business models for increasing engagement of private sector in green nature based urban investments. (**ADB Led**)

This output will support the decision makers in making a case for NbS as a cost-effective way of addressing climate change and urban challenges in delivering economic, social as well as additional environmental benefits. The output will support valuation study in Lake Kadapakkam to quantify the economic, social, and environmental benefits from the investment. The lack of information on these aspects usually results in economic non-viability of NbS investments using conventional business models and return-on-investment.

This assessment will also be used to evaluate potential for private sector engagement in implementing NbS and enable augment public financing of such infrastructure, as studies show that almost 75% of NbS are funded from public sources (public budget / direct funding or subsidies). The analysis will support developing a well-articulated business case for investing in NbS over other competing priorities. The analysis will also identify how to share the investments by assessing the environmental and social benefits and related economic returns from such investments. The assessment will also identify the measures the government could take in creating enabling conditions for catalyzing financing from the private sector. The output will explore the possibility of using funding obligations of the private sector as per India's Companies Act related to Corporate Social Responsibility (CSR) under Schedule VII of the Act.

Under the ADB loan, a performance incentive scheme will be established by GCC, which will be linked to operational efficiency and the sustainability of stormwater drainage systems. The incentives will be awarded based on a reporting system and database of key performance indicators for all zonal offices that will be established by 2023, with the focus on improving GCC management of drainage systems and budget administration for timely maintenance services. The performance indicators will include zonal offices regularly reporting on their maintenance activities and flood status, the timely completion of maintenance activities, and the incidence of flooding and inundation in zonal areas. Downstream use of received incentives for constructing green infrastructure and procuring equipment for sustainable O&M are also targeted.

The output will undertake workshops and seminars for civil society, private sector, state government officials, various departments of GCC, ward level governments to explore "urban green financing" challenges and models. The aim is to encourage green space expansion as part of the performance incentive scheme.

| | Deliverable |
|---|---|
| 3.2.1 | Business case established through valuation study in Lake Kadapakkam to quantify the economic, social, and environmental benefits from the Nbs and encouraging private sector participation in water body restoration projects. |
| 3.2.2 | A zone-based performance scheme incentivizing expansion of ?green space? (GEF) and creation / maintenance of stormwater drainage (ADB) for GCC |
| 3.2.3 | Capacity building conducted for Chennai and Tamil Nadu urban development entities, civil society, private sector on urban green financing |

**Output 3.3:** PMC has innovative financing mechanism and business models based on land value capture for financing and engaging private sector in low emission resilient green transit corridors. **(UNEP LED)**

This output will support PMC, building upon the TOD rules and regulations, which are being finalized, to develop and implement a financing mechanism that supports investments for compact and low-emission resilient green corridors plan and the Station Area TOD plan prepared under output 2.2. Further, the output will support development of business models for private sector participation in creating green NMT and EV Charging infrastructure along the compact low-emission resilient green transit corridors.

To support the development of the Urban Transport Fund (UTF), a baseline assessment of the current situation in revenues from TOD areas, use of the revenues generated, financing approaches used for Urban infrastructure, etc. will be undertaken. This will be complemented with a literature review, including use of knowledge generated and collated by the UrhanShift project, to identify national and international best practices developed for long-term financial sustainability of TOD Corridors. These best practices will inform the analysis and the design of financing options. As part of the analysis a Light house city, with similar characteristics and circumstances as Pune, will be identified for peer-to-peer exchange. UrbanShift support will be sought for identifying the exchange city and establishing contacts. The peer-to-peer exchange will enable learning from practical implementation of the best practices.

In particular, the project will promote re-zoning and densification of public and private land along the corridors and align Pune transit-oriented development (TOD) policy, consistent with the component 1 plan. The financing mechanism will enable formulation of a model of revenue sharing between various stakeholders along with ring-fencing of revenue for necessary reinvestments in TOD areas and green corridors for enhancing public mobility.

A key challenge PMC faces is raising financing for urban transport infrastructure projects. This includes creating public transport infrastructure and connected access infrastructure, such as NMT for last mile connectivity, to increase the use and viability of public transport. PMC in order to address this challenge has proposed the creation of an urban transport fund to raise Rs. 2600 crore for metro rail project and Rs. 2300 crore for financing BRTS project. These finances will not be for fully funding the projects but used as leverage to attract other investments, including private sector investment. Further

the finances could also be used for maintenance and enhancement of infrastructure around the public transit nodes to ensure higher footfall and higher profitability.

This current approach is to raise funds through sale of additional FSI in the designated TOD areas along the transit corridors. The model is currently simply to levy a fee for higher FSI and use the funds to leverage investments for capital cost for Metro and BRT projects. Sale of FSI alone is not a sustainable approach as it is a finite resource. Thus, the output by developing the UTF will support the authorities in creating a more sustainable model of raising and using finances for public transport to strengthen compact and low-emission resilient green infrastructure transit corridors.

With support and knowledge generated as part of UrbanShift, the output will support review of national and international best practices generated from TOD oriented development in raising financing for developing mobility infrastructure. The focus will be on the tools and approaches used as well as application of these resources that make the investment in public transport such as MRTS and BRTS financially viable for the private sector. The best practices will be captured as a knowledge product and shared with the other cities. As part of the analysis a lighthouse city will be identified to provide an opportunity for Pune city staff to learn from practical implementation of these measures.

Based on the baseline assessment and best practices analysis, direct revenue raising and indirect revenue raising approaches will be identified for financing the transport infrastructure and its maintenance. For example, investment in green NMT corridors to enhance the ease of access to Metro and BRT could enhance the ridership and revenues, thus enhancing the viability of the investments. Similarly, value of these investments accrues to other actors in the TOD area, the output will support assessment of how this increase in value from proximate and indirect users may be captured through imposition and collection of tax (say increased property taxes in the TOD area) or levy  by the ULB or other state government institution as per their mandate.

The analysis will also assess and develop incentives, regulations, and economic instruments that incentivize private actors to densify and undertake mix-use development along the corridors so as to increase the value proposition for these actors and the tax base for authorities. This will include ? development charges reduction; density bonuses in case the developers amalgamate several smaller plots and develop the amalgamated land parcel with mandatory provisions to green infrastructure components, zoning incentives (usages, parking, etc.), and expedited permits and approvals etc.

It is necessary that such revenues should be earmarked for use in urban transportation related projects. For this purpose, it may be necessary to ring-fence these revenues from the consolidated fund of state governments and ULBs. The Government of India has encouraged state governments to set up a dedicated urban transport fund by earmarking specific state and local taxes for meeting investment requirements for urban transport. The output will support the development of policy to ring fence the revenues and also model of revenue distribution structure to fund a more integrated public transport mode.

Additionally, the output will support development of a business case for implementing the PPP model to enable engagement of the private sector in implementing green NMT corridors and EV infrastructure. This also allows the PMC to use it limited resources in meeting the sustainable

investment requirements as well as address the challenges faced by PMC in raising loans. The support will include broad market assessment and indicative environmental and social benefits, and  project viability for various PPP scenarios. This will be used to prepare recommendations for PPP models in terms of sharing of development costs, approaches for implementing service charges, lengths of shared ownership, etc. The focus of this output is to enable the city to generate revenue through service charges from like EV charging infrastructure, NMT infrastructure and scientifically informed tree plantation for reducing urban heat island effect along these low emission green corridors can be made viable and implemented through private sector participation. It will also bring benefits in terms of accruing own-source revenue for otherwise cash strapped budgets. The results, together with the financing models, will be assessed and made available for upscaling and replication through component 1& 4.

The analysis and the deliverables will be developed under the guidance of the Coordination Group established for Pune City. This group will also facilitate the adoption of the recommendations as part of its policies and rules of operation. Private sector, civil society (including representation from resident associations), financial institutions and relevant research organizations too will be engaged in the consultations and seeking suggestions and improvements. Specifically focus will be on Distribution companies, EV companies and charging infrastructure developers in context of the PPP model for EV charging infrastructure. The capacity building workshops will be undertaken for the Coordinating Group member, and any other relevant government entity on operationalization and use of the UTF.

|  | Deliverable |
|---|---|
| 3.3.1 | Baseline assessment of the financing of Urban infrastructure, generation of revenues from TOD areas and their application. |
| 3.3.2 | Assessment report of national and international best practices on long-term financial sustainability of developing and maintaining Compact Low- emission Resilient Green Transit corridors. |
| 3.3.3 | Linkages established with a Lighthouse City to learn from practical experience of implementing Compact Low-emission Resilient Green Transit corridors using TOD approach. |
| 3.3.4 | Design of Urban Transport Fund (UTF), using innovative financing  mechanisms for ensuring TOD  implementation  and  maintenance  through land  value  capture, and support establishment and operationalization of the fund. |
| 3.3.5 | Feasibility assessment of business models for implementing green corridor elements (based on pilots) and deploying Business models/ PPP initiatives by collaborating with corporate/ private sector for greening NMT infrastructure and developing EV charging infrastructure along the Compact Low-emission Resilient corridors. |
| 3.3.6 | Capacity building of key stakeholders on operation of UTF and business models for PPP to create green NMT and EV charging infrastructure. |

**Output 3.4:** SMC has (i) innovative financing solutions for managing climatic hazard; and (ii) business models for engaging private sector in development of nature based low emissions NMT infrastructure. (UNEP-Led)

The output will support the conservation of biodiversity and ecosystem services through strengthening of financial capacity of SMC/SUDA to ensure low-emission resilient coastal zones development in Surat. To support the efforts of the SMC/SUDA in implementing the integrated resilience plans/strategies created at Output 1.3, this output will support the development of innovative and diversified finance instruments that promote sustainable development of coastal zone. The lessons learned could be applied to the investment financing of sustainable integrated urban development.

Building on the work on NMT infrastructure and Public Bicycle Sharing Scheme (PBS) in output 2.3, this output provides support to the SMC in conducting due diligence, prefeasibility and a business case for undertaking investment in green NMT infrastructure and a Public Bicycle Sharing (PBS) Scheme with involvement of private sector. The business case will include broad market assessment and indicative environmental and social benefits, project viability for various PPP scenarios and a recommended project structure for project implementation through the private sector. The payment for services rendered by private players may come from a combination of user fees, concessions from SMC, etc. The focus of this output is also to nudge the city to generate revenue so that services like Non-Motorized Transport/PBS can be made PPPable. This work will be undertaken in partnership with the private sector that is interested in investing and creating green NMT infrastructure and operating PBS. The PPP approach would be equally applicable to green NMT infrastructure and PBS schemes in other parts of Surat city. SCM will adopt the scheme and use this as a basis for investment in the Dumas SeaFront PBS scheme.

The output will also support the SMC in addressing the key challenge of funding green/environmental infrastructure and use of NbS by a better coordination of budgetary allocation to the various departments of the Surat and Gujarat government entities for investments in city infrastructure development. The output will assess the budgetary allocations of different departments and identify investment opportunities based on the integrated planning approach. For example, the budget for creating and maintaining green spaces with the Gardening department is spent in isolation from the budget for creating town plan level streets and NMT infrastructure. The integrated planning approach will provide control regulations on integrating green spaces and streets and NMT infrastructure at town plan level. The objective is to create a similar process that allows for combining available budgets of the two departments in creating connected green spaces and green NMT infrastructure fulfilling mandates of both entities as well as achieving objectives of integrated planning. Similarly, the assessment will look at budgetary allocations and projects for maintaining water bodies and other ecosystems as well as budgetary allocation for creating water management and drainage infrastructure. The analysis will identify all such opportunities and develop a process linked to integrated plans that enable entities to coordinate project investments to achieve maximum benefits (such as pooling tree planting budgets for SMC and SUDA; pooling road development funds to promote NMT infrastructure etc; pooling healthcare budgets; pooling budgets of SMC/SUDA and Gujarat Coastal Zone

Management Authority develop biodiversity area). The recommendations will be integrated with the financial approval process.

To raise additional finances assessment of contribution of blue-green infrastructure to property values in the coastal zones and use the data for fiscal policy design (e.g., instituting an ecosystem service use fees, property taxation and land value capture). This broadening of value proposition to include environmental benefits in value capture will help mainstreaming NBS into the municipal finance system. Further, potential and approach will be assessed for ring fencing betterment levies (payments by landowners or beneficiaries in an area to capture a portion of the land value accruing from green infrastructure projects) derived in coastal zones with new green infrastructure. As the betterment charges are one-time payments, the revenue raised through this mechanism will be treated as a revolving fund where the funds will be used to create new green infrastructure. Consultations will be undertaken with the private sector, representatives of entrepreneurs operating in the coastal zone, investors interested in tourism infrastructure in the coastal zone, and civil society organizations working on gender and inclusivity issues. The analysis developed will be shared and solutions co-created with these stakeholders in partnership to enhance ownership.

Finally, this output will support SMC in developing a portfolio of diversified green infrastructure projects based on the plan developed for the Dumas and Khajod Coastal Zone. Given the infrastructure requirements to meet the demand for urban services, SMC need to spend huge amount of money on urban infrastructure creation. The Comprehensive Mobility Plan (2046) estimates the urban transport infrastructure requirements at $ 5 billion and additionally the Development Plan (2035) estimates the urban infrastructure requirements at $ 4 billion. The output will support identification of green NMT and transport corridors as well as infrastructure projects associated with flood management, tourism infrastructure creation and support integration of NbS measures in these projects. The basket of projects that need large investments and have larger impact on reducing GHG emissions etc. will be placed under a green investment portfolio. SMC/SUDA and other agencies will then approach a wide range of institutions such as private foundations or corporations, private equity funds, impact funds and specialized financing facilities for preferential terms for funding of these projects. Through the successful demonstration of the innovative financing options to for these projects, the output aims makes Surat an investment destination for green investments.

Training modules will be developed based on the various deliverables prepared under the output and training organized for all the relevant stakeholders. The training will cover undertaking assessment for integrated investment planning; benefits assessments including social, environmental and economy from integrated projects; and approaches to identify opportunities for revenue raising, their impacts on investments, and required regulator frameworks to operate the system.

|       | **Deliverable** |
|-------|-----------------|
| 3.4.1 | PPP funding model, including pre-feasibility assessment, for NMT infrastructure creation and PBS in Dumas Pilot Project Area |
| 3.4.2 | Coordinated and cooperative investment planning mechanism for NBS among various departments to pool investment budgets established |

| 3.4.3 | Feasibility of instituting an ecosystem service use fee, and ring fencing various land-based revenues to protect and develop coastal zones using NbS |
|---|---|
| 3.4.4 | A portfolio of ?investment ready? green infrastructure projects developed and presented to wide range of donors |
| 3.4.5 | Capacity building of key stakeholders on Financing Coastal Zone ecosystem protection using NbS and private sector engagement |

**Component 4- Knowledge Exchange and Capacity Building**

*Outcome 4: Increasing number of Indian City authorities and stakeholders use the knowledge, tools, best practice examples, made available on National Urban Learning Platform (NULP), hosted by NIUA, and linked to UrbanShift, to develop and implement integrated sustainable development plans and investments.*

This component will focus both on creating capacity and better awareness of integrated urban planning, developing financing plans for implementing sustainable projects, and leveraging various sources of financing including financial mechanisms to engage the private sector in addressing the sustainable urban development challenges. The component will support creation, compilation and accessibility to knowledge, best practices, case studies, and planning tools developed through the project, under the UrbanShift global project, and through other similar initiatives. The capacity building and awareness will occur at three levels:

(i)        Urban and relevant State government officials, private sector, civil society organizations, think tanks in the three primary target cities.

(ii)       Urban government departments in the states in which the primary target cities are located.

(iii)      The national level peer to peer exchange between government and non-government stakeholders through national dialogue and through web-based interactions.

The GEF funds will support the above activities. In addition, the City authorities of primary target and replication cities will benefit from the capacity building and peer to peer exchange offered by the UrbanShift global project.

This component will thus scale-up integrated sustainable urban planning practices in India through making available knowledge and best practices to all Indian cities through a national platform and capacity-building in primary target cities, replication cities and other cities in the three states. NIUA, India?s leading national think tank on urban planning and development under MoHUA, is the hub for the generation and dissemination of cutting-edge research in the urban sector. MoHUA has recently established the Centre for Digital Governance (CDG) at NIUA for pursuing use of technology to address urban challenges across cities by fostering innovation at the local levels and encouraging participatory governance across 4400+ cities in India.  In addition, the Climate Centre for Cities (C-Cube) has been established at NIUA to create synergy across all climate actions which are being

undertaken in Indian cities by various stakeholders. NIUA thus provides a well-established institution to deliver the benefits and experience of the three primary cities to other cities in the country.

The component will use the experiences, good practices and lessons learned through components 1, 2 and 3 in creating a better awareness of approaches and tools. In this sense, the project scales up from local to national by drawing on the experiences in the target cities and sharing these nationally through the knowledge platform. To maximize efficiency, the project will also scale from global to national, as the India knowledge platform will draw on the materials of the UrbanShift global project, providing local stakeholders with opportunities to learn from experiences both nationally and internationally. Furthermore, a national capacity-building programme will build upon the platform and other component experiences, and draw upon global UrbanShift support, to train local, State and Central government representatives in undertaking integrated planning. The programme will be open to representatives of Indian cities beyond the pilot cities, supporting key stakeholders to draw upon national and global good practices in their urban planning and development processes.

Drawing on the UrbanShift global project's training sessions, it will also foster learning for national counterparts, and their interactions with key stakeholders from other child projects will facilitate cross-learning. The transfer of knowledge and best practices through South-to-South, North-to-South, and peer-to-peer initiatives is a core component of the global program. National stakeholders will draw on such know-how as they implement their actions.

A key element is that this component will work with the state level government institutions (YASDADA in Maharashtra, GUDI in Gujarat) that provide the training and capacity building needs for the government officials through the NIUA. NIUA will support these institutions in integrating the integrated sustainable planning and sustainable financing related materials as part of the training curriculum of these institutes.

The component will thus increase the availability of cutting-edge knowledge and best practices on sustainable integrated urban planning and investments which is increasingly used in undertaking various development plans as well as investment projects.

**Output 4.1:** Knowledge products, good practices and tools are made available to national, state and city authorities as well as other stakeholders through the NULP linked to UrbanShift.

The National Urban Learning Platform (NULP) is established by MoHUA through NIUA as a capacity building platform to drive urban development in the country. Designed as a customized ? on demand - Learning and Content Management System embedded within everyday city functioning, it intends to provide tools for content creation, content organization and management, assessments, and certifications through its digital infrastructure. It intends to create a robust supply of aggregated and curated content by involving various domain experts or institutions for addressing the diverse needs of urban capacity building.

This output will leverage the NULP and the work on climate smart cities knowledge sharing efforts to disseminate the knowledge generated, resources, and data through the project and through the global programme on national and international experiences, good practices and lessons learned, including a

dedicated project website linked to the UrbanShift platform. The website will also provide a forum for the local government officers to discuss urban development challenges with their peers, civil society, and experts.

In addition, knowledge created through other initiatives, such as the GIZ initiative with MoHUA aimed at planning and implementation of smart and climate-friendly measures for infrastructure and area-based development, will be made available through the website.

All the guidelines, tools, best practice examples, and other material generated in support of the three primary target cities will be curated and made available through the web platform. Training modules will be developed based on the city level deliverables and these training materials will be shared with the State Urban Development Institutes as well as made available on the web platform. This web platform will also be the entry point to access the knowledge developed and shared through the UrbanShift platform. The India country project knowledge products too will be shared with the other partner countries and cities through the UrbanShift platform.

The output will work with NIUA and MoHUA to use the guidelines and tools (TOD Station Planning guidelines, Integrated Low emission resilient coastal zone planning, Flood Resilience Index, Integrated flood hazard and spatial urban development plan, etc.) to develop guidance for the cities to adopt. Further, it will use the city deliverables to cull out the supportive policies and development control regulations to recommend to the state and city authorities for adoption. The knowledge from these guidelines will also be integrated with the climate smart city assessment framework of MoHUA to enable cities track their progress on taking actions to address climate change.

Further, under the output will work with MoHUA and MOEFCC on undertaking consultations to integrate climate change aspects in developing planning and investment decisions based on development plans. This could be in form of frameworks to undertake climate change impact assessment, both, in terms of GHG emissions and resilience in lines similar to the Environmental Impact Assessment (EIA) undertaken for programmes and project implementation. This will built on the work under the GEF6 ? Integrated Pilot Action Programme (IPAP) for India on methodology for sustainability plan development. This will also be linked to the climate Smart Cities Assessment Framework developed by MoHUA to support cities in assessing the degree of integration of climate mitigation and adaptation aspects into city development.

To assess the awareness among the urban planners on integrated sustainable planning, innovative financing mechanisms, business models to promote investment in green and blue infrastructure, etc. a survey will be designed and undertaken in the selected cities of the states in which primary target cities are based and a sample of cities in other states across India. The primary target cities will facilitate the survey in their respective states. NIUA will coordinate the effort and undertake surveys in other select cities. This survey will be repeated at the end of the project to assess progress. The survey will also include identifying the investments and planning approaches used in the cities aligned with the project objectives.

The output will also develop a communication strategy for disseminating the knowledge, good practices, and experiences of the project implementation in India as well as in other child projects to all

the national, state and city level authorities. This will also cover awareness reaching out to CSOs, research institutes and think tanks, as well as academic institutes. MoHUA and NIUA?s communication programmes and channels will be used to share information. This will also include developing stories, policy briefs, etc. (work done by City projects) for dissemination.

NIUA will also use its communication channels, such as regular newsletters, webinars, and other means of awareness creation to disseminate the information on the deliverables of the project. These channels will also be used to track information on application of integrated sustainable planning and innovative sustainable financing by the Smart Cities Network in India. The communication approaches developed will also encourage the cities to make commitments in implementing the measures and track their progress. This programme will be largely through the co-finance of NIUA.

All the knowledge products, tools and good practices will also be shared with all the relevant stakeholders in replication cities. Replication city authorities will be actively engaged and will also play a very collaborative role in creation of these products and tools. City officials and other stakeholders in replication cities will also be able to participate in UrbanShift activities.

Support will be provided to Madurai city to learn from relevant NbS experience, strengthen institutional capacity for integrated water resources management through web platforms & other knowledge platforms and tools. Madurai will be encouraged to participate in all the activities planned for the primary cities including capacity building, national dialogues etc. Madurai will be encouraged to increase its ambition in sustainable development specifically in NbS investments. Madurai will also be part of network which will either collaborate, consume and co-create training modules on sustainable urban planning, urban finance, climate resilience, etc.

| | Deliverable |
|---|---|
| 4.1.1 | Develop Project Specific Website integrated within NULP and other knowledge platforms of NIUA including linkage with UrbanShift website to share the knowledge products and tools developed under the UrbanShift. |
| 4.1.2 | Compilation of good practices, experiences, guidelines, lessons learned and policy recommendations from project activities under components 1, 2 and 3, for uploading to the platform (undertaken as part of city work) and shared with UrbanShift, including recommendations on policies and development control regulations for integrating these aspects into development and investment planning by States and Cities. |
| 4.1.3 | Creation and finalization based on lessons learned of training modules on sustainable urban planning, urban finance, climate resilience etc. based on primary target city (undertaken as part of each city work). |
| 4.1.4 | Policy framework for assessing impact of development plans and investment decisions on climate mitigation and adaptation to integrate climate change consideration into urban development planning and investment decision. |

| | |
|---|---|
| 4.1.5 | National sustainable cities communication campaign (including surveys before and after the campaign) to:<br><br>i.   Inform cities of the platform and the available knowledge products and capacity-building efforts (output 4.2)<br><br>ii.   Encourage their participation in the national dialogues<br><br>iii.  Encourage them to scale-up ambition on sustainable urban development, with their commitments captured on the platform |

**Output 4.2:** Indian City stakeholders? capacity and awareness enhanced to undertake integrated sustainable urban development addressing climate change, biodiversity, and land degradation challenges.

This output will be carried out by the primary target cities in partnership with NIUA. The key focus of the output is to use the experience from the three primary target cities to share with other cities. This will done through two main channels ? training workshops for city authorities of the states in which three primary target cities are locates, and National Dialogues based on the UrbanShift national dialogues (conducted under Output 4.3).

Each of the primary target cities will organize, in partnership with NIUA and its affiliated state level institutes, peer-to-peer exchange and capacity buildings events for other cities within their states based on the work undertaken under the components covering:

(i)      Three workshops will be supported by the GCC to increase awareness of how NbS applications for flood risk management (ie ?sponge cities? concept) can generate multiple benefits. This will be supplemented by lessons from the experience of other cities.

(ii)     Three workshops to be supported by PMC on Gender responsive Transit Oriented Development and green corridors development and developing NMT infrastructure and promoting Net Zero Energy Buildings. This activity will be built around improving the principles of Transit Oriented Development, Green corridors development, green infrastructure schemes, practices, learnings, material choices, maintenance, and performing assessment.

(iii)    Three workshops to be supported by SMC on biodiversity and environmental management in coastal zones, green corridors development, developing NMT infrastructure and hazard risk financing. This activity will be built around protecting coastal zones in cities through NBS, Green corridors development, green infrastructure schemes, practices, learnings, material choices, maintenance, and performing assessment.

Staff of other State urban Development Institutes in the region too will be invited to participate in these training sessions. This will enable the creation of a set of trained trainers for other states to train the government staff of cities in those states. The replication cities too will participate in these training workshops conducted by their twinning cities. The replication cities too will participate in these training workshops conducted by their twinning cities.

This output will also provide capacity building and create awareness among community members, CSOs and other stakeholders on the integrated sustainable planning and developing work undertaken in the primary target cities.

(i)        In Chennai, the effort will be built around improving the principles of green infrastructure and shall include flood risks and impacts, rainwater harvesting, and the links between flooding, solid waste and wastewater, health and social concerns, and the protection and restoration of water bodies through NbS.

(ii)        In Pune, to facilitate knowledge sharing and peer to peer learning, the narrative of Transit Oriented Development and Green Corridors development, the project will actively improve the capacity of public agencies, community members, CSOs and other stakeholders relevant to the project.

(iii)        In Surat, the practice of biodiversity and environmental management of coastal zones and low emissions mobility options such as PBS, NMT with green corridors will be imparted to build the capacity of public agencies, community members, CSOs and other stakeholders relevant to the project.

(iv)        In Agra, the CSO and academia will be engaged in the development of the Station Area TOD as well as the plan for piloting the NMT infrastructure in and around the TOD station areas.

(v)        In Puducherry, the CSO and academia will be invited to the consultations on the finalization of the CDP for the three zones.

(vi)        In Madurai, facilitate in communicating the knowledge around the process of the creation of Green Investment readiness roadmap for NbS water body rejuvenations and build capacity among stakeholders to mainstream this action by a combination of both in-person and virtual workshops. Relevant stakeholders in Madurai will also participate in all the 3 national dialogues, trainer workshops and the virtual workshops that will organized by NIUA. The intervention will also include local stakeholder consultations on possible NbS intervention in the city and support pre-feasibility and due diligence for an investment roadmap, which will identify potential ?nature positive? projects for the city. Madurai will be encouraged to increase participation of women in the training activities.

At least 200 persons will be trained in this activity, with not less than 40% women. The activity will be anchored within the scope of delivery of the primary cities municipal corporation?s activity. For the purpose of training, various modes like virtual workshops, virtual Master Classes, in-person workshops, site visits, expert visits, webinars, etc., will be utilized. Since women & children are most vulnerable to the impact of climate change, a dedicated module on gender responsive infrastructure development will be created and included in all training programmes. Organizations working in the area of children welfare & vulnerable population in the project geography will be given importance and priority for the training.

In collaboration with the NIUA each city will conduct National Dialogue. This will be held in-between the two National Dialogues conducted by UrbanShift, one at the beginning of the project and one in the final year. National dialogues aim to strengthen system-wide national enabling conditions to support cities in undertaking integrated planning and investments through sharing of knowledge produced from

project and experience of other cities undertaking similar activities. These dialogues will include relevant national authorities and cities, including those beyond the pilot cities. The National dialogue will build on the structure of the National dialogue conducted by the UrbanShift. The dialogues will also be used as a forum to seek pledges for actions from cities in integrated sustainable solutions into the development and investment plans of the cities. The Project manager will be responsible for developing strategic partnership in organizing these dialogues.

|       | Deliverable |
|-------|-------------|
| 4.2.1 | Each primary target city conducts, at least three virtual or in-person workshops /training sessions for other cities in the state, in collaboration with state institutions and NIUA, and targeting at least 40% women participation, to share experiences with integrated sustainable planning approaches demonstrated in respective primary target city. |
| 4.2.2 | Each Primary target city conducts training of trainers workshop for State level Urban Development Institutes of at least 3 States in collaboration with NIUA |
| 4.2.3 | 3 National Dialogues conducted in partnership with NIUA and NULP to disseminate knowledge and experience gained from implementing project activities and for peer-to-peer learning from other efforts in the country. |

**Output 4.3:** Primary target and replication city authorities and relevant state authorities gain enhanced understanding of integrated sustainable urban development through participation in capacity building and awareness raising activities of the UrbanShift.

The primary target and replication cities will benefit from participation in the capacity-building program offered by the UrbanShift. This will include as follows:

? UrbanShift national dialogues: National dialogues aim to strengthen system-wide national enabling conditions to support cities in undertaking integrated planning and investments. The UrbanShift global project aims to organise two national dialogues in each child project country, one at the beginning and one at the end of the project. The project will support one national dialogue in the middle of the project. These dialogues will include relevant national authorities and cities, including those beyond the pilot cities. Through these dialogues, India will benefit from the knowledge and experience of the global project partners - UNEP, WRI, ICLEI and C40 - to address key national challenges to sustainable urban development. The project federal capacity-building program will align with and build upon these national dialogues. For instance, the first national dialogue may be used to launch the national platform, highlighting its relevance for local stakeholders, as well as supporting the identification of key national and ecoregional needs with regards to capacity-building, thus facilitating the design of the federal capacity-building program and in-country UrbanShift activities.

? UrbanShift Capacity Building: The UrbanShift global project will offer a wide variety of capacity building and training activities for representatives of the pilot cities, including UrbanShift Labs, City Academies, Peer Exchanges and Finance Academies. These will be organized by the UrbanShift global project in coordination with local authorities of the pilot cities. The project federal

capacity-building program will build upon the UrbanShift activities. For instance, results from the city academies focused on the pilot cities will be captured on the national platform (output 4.1) and the global UrbanShift platform. The project federal capacity building program may draw upon the city academy methodology and training material as it designs and executes capacity-building activities for training workshops across the country.

The replication cities will also be actively encouraged to participate in the various workshops to be conducted as part of the UrbanShift program both at the city and national level.  The replication cities will also be invited to participate in Urbanshift labs, City academies, Peer exchanges and Finance Academies that will be conducted by the various institutions like UNEP, WRI, ICLEI and C40 that are part of the Urban Shift program. The replication cities will also be part of network which will either collaborate, consume and co-create knowledge products for the UrbanShift project.

|  | Deliverable |
|---|---|
| 4.3.1 | Participation of primary and secondary city stakeholders in three National Dialogues organized by UrbanShift (Two dialogues by Urban Shift and one supported by the project) |
| 4.3.2 | Participation of target and replication city stakeholders in global UrbanShift- activities: <br> - UrbanShift City academies <br><br> - UrbanShift Regional forum <br><br> - UrbanShift Global peer-to-peer exchanges |

# d. Alignment with GEF Focal Area and/or Impact Program strategies

The project responds to and reflects the sustainable cities impact program approach. Its activities and interventions address key urbanization environmental challenges and foster a sustainable transformational change in urban economic systems. The project will facilitate integrated and sustainable urban development through the implementation of evidence-based spatial planning tools and build deep urban resilience with low-carbon technologies in buildings and transport. Measures will also be implemented to promote conservation and regeneration of green spaces and biodiversity in urban landscapes. Good practices and lessons learned resulting from the project will be shared with the sustainable cities impact program to strengthen knowledge exchanges around the globe. The project is aligned with the GEF impact program strategy for sustainable cities and the following focal areas:

?       Climate Change Mitigation: CCM-2-5: Demonstrate mitigation options with systemic impacts for sustainable cities impact programme;

?       Biodiversity: BD-1-1: promoting approaches to increase biodiversity in rejuvenation of natural ecosystems in urban landscapes. Coastal zone natural ecosystems will be preserved through integration

of the ecosystems in land planning and development as well promoting approaches to create value for the ecosystems through various education and recreational uses.

# e. Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing

Current urbanization patterns across India are focused on increasing the availability of services and inclusiveness of development. Though initial efforts have been initiated towards recognizing the sustainability issues the efforts are at nascent stage and the development is likely to continue on unsustainable development pathways and also create significant global environmental costs. Furthermore, in a business-as-usual scenario, cities will continue to grow in unsustainable patterns with some minor measures to address more acute short-term issues. The challenge of urban sprawl is expected to continue, occupying additional areas of peri-urban land, with impacts on biodiversity loss, land degradation and increased ecological fragmentation. The challenges of floods and droughts are expected to continue with the focus on grey infrastructure to address the issue in absence of land use planning integrating the land topography, drainage channels and other natural ecosystem?s role in the addressal of this issue. Similarly, the development into coastal zone though is guided by coastal zone management plan, it is more of a land use regulation then focused on integrating coastal zone ecosystems into development and protection of coastal areas. Urbanization close to coastal areas is likely to increase the vulnerability to climatic changes as the natural protection mechanisms are eroded by Business as Usual (BAU) development. This results both in loss of biodiversity and green spaces as well as low resilience of the infrastructure.

Greenhouse gas emissions are also projected to increase under a business-as-usual scenario, as Indian urban areas continue to grow outwards (horizontally), increasing the transit distance and time, creating congestion. Though focus has been put on public transport (BRTS, MRTS, etc.) the effecting NMT and public transport access network will continue to keep the utilization of public transport low. This will lead to a growing dependency on the private vehicle as the primary form of transport, leading to higher transport emissions. Similarly, under a business-as-usual scenario Indian cities are projected to grow with low consideration of energy efficient design and construction, leading to increased greenhouse emissions from building and increased electrical appliance usage.

At the national level government has initiated actions to address climate change and sustainable development, through efforts such as Climate Resilience City Assessment Framework, State Climate Action Plans, their implementation has not yet been integrated with the urban planning process. It is still seen as an add on effort or merely assessment efforts. Root causes and barriers exist that impede India?s efforts to transition to a pathway of such development. As noted in section 1, these include:

? Ineffective integration of planning across sectors and jurisdictions;

? Limited local examples and practical, hands-on experience with integrated, innovative and sustainable solutions that demonstrate multiple local and global benefits;

? Insufficient finance available to implement sustainable urban investments at scale, including investments in maintaining and expanding green spaces, corridors, and natural ecosystems within the city jurisdiction;

? Inadequate mechanisms to facilitate dissemination and replication of experiences, innovative practice and lessons learned on integrated sustainable urban planning.

A number of national efforts such as Smart Cities, AMRUT, NCAP etc are being implemented and although there is support from a regional and international agency it is not sufficient to address the root causes and barriers.

The incremental cost reasoning of this project is that GEF financing will build upon existing investment by governments at the central, State and local levels (such as that noted above) to support them to overcome the above listed root causes and barriers. The incremental cost of the interventions is expected to lead to transformational shifts through:

? From sectoral planning to integrated, evidence-based spatial planning for sustainable urban development;

? From environmental degradation, biodiversity loss and fragmentation, and increasing land degradation in peri-urban areas to an urban development approach that values natural assets, privileges nature-based solutions, promotes sustainable land management and conservation in peri-urban areas, ensures consistency between environmental regulations and urban development, and promotes the implementation of biodiversity policies and laws at sub-national and national levels;

? From a sprawling urban form to a compact, low-emission, resilient and resource-efficient urban environment;

? From traditional finance to innovative financial solutions that mainstream sustainability and support municipalities to mobilize finance from public, private and innovative sources;

? From ad-hoc efforts to learn from, and adapt, sustainable urban development lessons to systems for capturing and sharing good practices and lessons learned nationally and internationally.

Under the alternative scenario sustainable development and conservation efforts begin to incorporate environmental territorial planning, so that areas of intensive, current or potential development coexist, alternated by a matrix of territories with low intensity of occupation, where sustainable use and production activities are carried out, that house and interconnect protected areas and other priority areas for protection. In this matrix, viability, buffering and connectivity are ensured for the long-term conservation of biodiversity and of land, which, among other values, provide fundamental sustenance and underpin a way of life for local communities. Urban populations, for their part, are benefitting from conserved and/or restored green spaces, which are providing habitat of their own, in a manner analogous to habitat services provided elsewhere in the so-called ?productive landscape.? Through its

combination of planning, investment, finance and knowledge efforts, the project moves the scenario strongly in this direction. In this scenario, cities are playing a crucial role in meeting the wider, landscape-level challenge facing increase in unsustainable development, growth in greenhouse gases and increased loss of biodiversity in the baseline.

In Chennai the project has a very specific and pointed intervention to demonstrate NbS intervention in rejuvenation of the water bodies as an integral part of flood management. In absence of first-hand experience, the city is likely to continue with the standard approaches of water body management, mostly through grey infrastructure. With the GEF support the Lake Kadapakkam restoration will create a business case for nature-based restorations and establish a sustainable model to be adopted and scaled for other water body restorations across the city and beyond. The proposed GEF project aims to expand upon the activities carried out in the baseline project and ensure a nature-based solution is integrated, which complements the structural solution to be introduced by the baseline project. Given that cities in India face similar urban flood challenges and loss of natural environment and biodiversity, the GEF project is timely and has significant potential for replication.

# f. Global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF)

The direct GHG emission reductions result from increased use of public transport and walking/cycling trips within town plan areas/station TOD area from the implementation of pilots for NMT infrastructure integrated with the public transport corridors. Impact of reduced travel demand from TOD approach to contributes to the GHG reductions. The direct GHG emission reductions also result from scale up in the target cities of Pune and Surat. The indirect emission reduction are estimated as uptake of the Pune and Surat pilots in other cities through the capacity building and awareness raising efforts undertaken in Component 4. The total GHG emissions reduction from the above are:

(a)  Direct Emissions reductions = 7,392,285 metric tCO2e

(b)  Indirect Emissions reductions due to influence of pilots across India = 28,498,000  metric tCO2e

(c)  Total Emissions Reductions = 35,890,539   metric tCO2e

In addition, GHG sequestration will also results from restoration of Lake Kadapakkam in Chennai and scale up of the NbS based rejuvenation at the city level. Total area of 48.4 Ha is restored and 2.42 Ha of forest and vegetation planted as part of the restoration of lake Kadapakkam . This results in sequestration of 434 tCO2. The scale up at city level will result in indirect reductions of 26,686 tCO2.

Adaptation benefits from project accrue from 48.6 Ha of land managed for climate resilience as part of Kadapakkam lake restoration.  The NbS restoration in lake Kadapakkam will create an additional storage capacity of about 1.75 million m3.  This additional volume will reduce the flooding risk and

also serve in rejuvenating the ground water table which will provide water during the dry seasons and drought. Lake Kadapakkam will handle the dual stress of flood and drought.

Biodiversity: The intervention in lake Kadapakkam will also lead to the restoration of the habitat of many species whose numbers have dwindled over the past few decades. More specifically the Near Threatened (NT) species Spot-Billed Pelican (Pelecanus philippensis). The integration of conservation of coastal ecosystems in development plans through NbS measures will increase the green and blue ecosystems areas in city and thus result in increased biodiversity benefits. A total of 124 species belonging to 51 families were recorded in Lake Kadapakkam.

Lake Kadapakkam is currently located within a 30km buffer zone of Vendanthangal and Pallikaranai Marsh land that fall on the Central Asian Flyway. During peak migratory season the restored Kadapakkam lake will serve as buffer holding area for these birds as has been observed even in other smaller restorations in the region.

The Investment Readiness Roadmap for the replication city of Madurai will achieve many benefits across Land Development, Biodiversity & Climate Change focal areas.

Land Development: The Investment readiness roadmap will help in assessing and accelerate the investments in NbS in Madurai. Out of the 84 water bodies it is estimated that at least 20% of the water bodies will adopt NbS based lake rejuvenation leading to atleast 200 Ha restored in the next 5 year period.

Climate Change: The NbS-based water body restorations in Madurai will increase the water holding capacity in Madurai by about 7 million m3. This would significantly reduce the flood risk. This additionally volume will also recharge the ground water and serve as water source during the dry seasons increasing resilience for drought.

Detailed methodology and explanations are provided in Annex M of the attached CEO ER document.

The project will also promote resilience to climate change in coastal areas of Surat, which have recently brought under SMC Town Planning Area. A total area of 20.577 sq km will be covered in the integrated Low emission resilient development plan for Dumas area. This will result in identification and protection of mangroves, wetlands, etc. using NbS approaches to enhance the capacity of these ecosystems to support coastal zone flooding from storms and tides. Thus increasing the resilience of the area. This will also result in increased and contiguous green spaces that reduce the heat island effect of BAU urban development and provide increased resilience to future increase in temperature due to climate change. The resilience will also be enhanced through integration of vulnerability maps to sea level rise and storm events into city databased by enabling integration of resilience measures in development of infrastructure developed in the coastal zones. The total area of forest area in the Dumas Seafront Project area is 23.07 Ha of Forest and 4.6 Ha of wetland areas. This area will be covered in the plan for protecting and maintaining the green areas integrated with NbS measures. This will result in both biodiversity benefits as well as land restoration benefits. The planning will also benefit through scale up of the approaches to coastal area of Surat City, which has total Mangrove area of 2,000 Ha, and other coastal wetland systems of 24,111 Ha. The approach by the project will enable protection and

rejuvenation of approximately, at 20% causality, 5,222 Ha. As the state departments in charge of forestry and coastal zone management authority will be engaged in the project, the extension of the approach to Gujarat coastal area could cover 103,100 Ha of mangroves and 2,413,100 Ha of the coastal wetlands. Assuming a 5% causality factor would result in additional 12,580 Ha of area being influenced through the project. **Thus, the GEF intervention through the plan development in Surat is likely to result in land conservation and restoration benefits for 17,830 Ha of mangroves and other coastal wetlands.**

In Pune the green areas will be integrated with the NMT infrastructure and the TOD corridors to increase the total tree coverage within the city. This will provide a much needed protection from heat island effect and increase the resilience to future increase in temperature from climate change.

These benefits are not quantified at the PPG stage but will be quantified in the implementation stage. The development of plans for the two cities will include an assessment of suggested interventions on increased resilience to climate change, biodiversity and reduction in GHG emissions reductions.

# g. Innovativeness, sustainability, and potential for scaling up

<u>Innovativeness:</u>

The project provides technological, management, fiscal and governance innovations relevant to India in integrated sustainable urban development:

?        Creation of a new standard for nature-based restoration supported by a ?first-of-kind? green-infrastructure manual

?        Actual design and implementation of a NbS investment. While not entirely new, the GEF support will contribute to a model for NbS which is appropriate for Chennai conditions. Important here, will be the way in which ?green and grey? approaches are blended, and the integrated way in which the investment is designed at the outset, to generate multiple benefits, including climate adaptation, biodiversity and ecosystems services, recreational value and associated sustainable financing. The aim will be to internalize these approaches into the city planning and development processes and structures, and

?        Leveraging the collective influence of established international city networks. Through participation in multiple city network platforms, urban practitioners can stimulate innovative processes through peer-to-peer interaction and through a common voice, advocate for systems change and transformation.

?        The project includes innovations in public policy planning and management for compact low-emission resilient green transit corridors through: public transport-cycling integration; public space design (NMT infrastructure, mobility hubs, green spaces networks) and EV ready infrastructure. The

innovation is also in planning and NbS use to develop and manage the coastal zone through eco-Development and Recreational and Eco-Tourism Development at Dumas, Surat. It will be operationalized with the concept of ecosystem-based approaches to develop local tourist hubs. The project shall have a component of promotion and integration of values of services/benefits obtained from multiple ecosystem services into decision making and operations of key economic sectors including infrastructure, and tourism.

? The project will also provide innovative solutions to urban planning through supporting the data-based management and planning through geospatial data mapping platforms which also integrate the participation of civil society and demonstrating use of these in the development of innovative integrated plans (Pune Station TOD Areas, integrated plan for coastal zone resilience for Surat in Dumas and neighbouring areas).

? The project develops an array of fiscal and governance innovations to speed up the adoption and implementation of sustainable urban development concepts. The project aims at developing innovative new revenue sources for financing sustainable urban policies (e.g., funds generated from fees for the provision of ecosystem services, land value capture and creating Urban Transport fund, models for partnerships with private sector (PPP partners in NMT and Public Bike Sharing Schemes).

? A key innovation the project uses is using an existing challenge faced by the city and using that as a basis of developing cooperative approaches. The project will bring together all the key government and private sectors as part of the development process and the lessons learned through this collective development of plans and pilots will be used to update the entities planning and project implementation processes.

Sustainability:

The key aspect of sustainability is working with the identified priorities of the city and with the city authorities to ensure a buy-in of the stakeholders by creating value through the project. The project is aligned with the Smart City Mission of Government of India which focuses on sustainable and inclusive growth.

The key to sustainability is uptake of project outputs by the city stakeholders in using them for their future works and initiatives. The project ensures that through integration of the guidelines and tools that are developed into the planning process of the city authorities. The plans will be co-developed and the lessons from the plan development process will be integrated with the develop control regulations that guide the city development planning.

The GEF-supported activities in Chennai will address sustainability through the following: i) focus capacity development and training on front-line civil service personnel and local communities, ii) align NbS with large water-related infrastructure investment to increase long term impact, iii) support for multi-stakeholder partnerships including CSOs, academic and research institutions, private sector corporations, and government institutions, iv) efforts to ?mainstream? NbS in city planning and

development, v) regular dissemination and knowledge sharing to increase uptake and retention, vi) a robust operations and maintenance approach for the NbS and an oversight Lake Management Committee, and vi) special attention to sustainable financing mechanisms, to strengthen the business case for private sector participation, incentive scheme for ward level governments etc. The technical, financial and operational sustainability are explained below:

(a) Technical Sustainability: The capacity building for the engineers of GCC in collaboration with other partners like Anna University & Tamil Nadu Institute of Urban Studies will ensure that the technical capacity to operate and continuous utilize the tools created as part of the intervention is mainstreamed in the city planning and operational processes.

(b) Financial Sustainability: All the tools and systems for data collection will be onboarded and mainstreamed via the Integrated Command & Control Center (ICCC) of Chennai Smart City. This is currently funded by the Greater Chennai Corporation from its capital budget. This will ensure continuity of operations.

(c) Operational Sustainability: The operations of the ICCC is done by engineers from Greater Chennai Corporation and private vendors. Over the next few years, the plan is to institutionalize all the core operations of the ICCC and outsource only non-core activities. This arrangement will ensure operational sustainability.

The digitization of the data used for co-developed plans and analysis carried out will be integrated into the ICCC, existing digital platform of the cities, along with the process for continuous data integration into the system is the third element that enables sustainability of the outcome. The ICCC operation and maintenance is funded by the city government through its budgetary allocations. The integration of the digital layers created by GEF funds and data gathering processes will thus become part of the existing annual operational budget of maintaining and operating the ICCC. Thus the integration into existing digital platform operated by the city government rather than creating additional platform  ensures its sustainability beyond the project.

Furthermore, the financial mechanisms and business models developed under component 3 will play a key role in supporting the sustainability of the project?s impact, by enhancing financial offers available to cities for implementing integrated urban plans and sustainable urban development actions. The focus of component 3 is directly on achieving the project?s sustainability of impact, by developing business models; creating incentive models; promoting financial sustainability of protected areas located in coastal zones and urban water bodies; and the strengthening or creating of national financing instruments for broad financial offer.
On the GEF investments in component 2, it can be expected that the various investments foreseen during the project (in green NMT, NbS measures for Coastal recreation zone, water body rejuvenation) will remain operational after the project conclusion, as they are aligned with the priorities of the local authorities and with the guidelines of national policies. These are also implemented primarily with City funds in case of Pune and Surat. The support from the project, by addressing the barrier of lack of examples for sustainable solutions, is expected to stimulate additional investments. This will occur due

to evidence gained and increased experience and confidence by actors in implementing such actors, leading to such investments becoming increasingly competitive compared BAU practices. The project will aim to demonstrate the cost effectiveness of these investments as a way of encouraging continuing green investment, including by demonstrating non-market benefits. The integration of coordination guidelines into the planning process of the entities will enable the retention of experience and its application to the future development planning and investments in the city. Further, the plans developed for Pune and Surat will also result in identification of development control regulations (DCRs), which will be taken up by the state and city government to officially adopt them. Thus, the experience gained on demonstration of integrated planning and demonstration will be integrated into the planning process and the regulations of land use control of relevant authorities, ensuring that the knowledge and tools are operationalized as an integral part of planning. The data collection process will also integrate data sourcing from wider stakeholders, such as civil society organizations, universities, etc. This will enable sustaining the additional digital layers beyond the project by creating a vested interest in its maintenance among city stakeholders.

Finally, the state level Urban Development Institutes (YASAHDA, GUDI, TNIUS) will be a repository of the knowledge created by the project. These institutes provide training and refresher courses to the existing and new staff. Integrating the knowledge within the institute's work will help continuous capacity building as well as sustaining its practices within the city and state planning processes.

Potential for scaling-up:
Scaling-up will occur at the national and local levels. At the national level, the national Sustainable Cities Platform (output 4.1 and 4.2) will play a key role in scaling-up the project by (i) raising awareness amongst key stakeholders as to the importance of integrated planning and sustainable urban development, (ii) making available through the NULP all the evidence, tools, guidance, good practices, etc. generated by the project, and (iii) building capacity of other city government staff through Urban Development Institutes (UDIs) of primary target cities as well as training the staff of other State UDIs based on the material developed through the project. The national capacity-building programme (output 4.2) covers training, seminars and educational materials, will support scaling-up by building the capacity of key local and provincial stakeholders in undertaking integrated planning and catalysing investment on sustainable urban development.

GEF support will be provided for knowledge sharing and transfer which will stimulate replication and scaling up horizontally and vertically through a number of means: i) uptake of NbS approach for all other water body restorations by GCC across the city ii) collaboration with TNIUS and NIUA under a national platform to engage cities, states and central agencies, iii) ?twinning? arrangement with a replication city (i.e. Madurai) for cross learning and creation of an investment roadmap, iv) participation in the global ?UrbanShift? platform to benefit from synergies with wider audiences, and v) creation of an ?investment readiness NbS roadmap for cities?.

At the local level, the project will develop a pipeline of investments based on the plans developed. The project will also bring in the private sector to identify the possibility of taking some of the investments in the pipeline. The project also has set up a donor coordination group to facilitate sharing of information on the city plans and project pipelines thus enabling creation of possibilities for replications.

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[1] GCC is the Chennai City Municipal Corporation

[2] https://www.luiscmda.tn.gov.in/public/

[3] https://floodlist.com/asia/cost-tamil-nadu-floods-347-lives-3-billion-dollars

[4] The assessment was done using the finest 1.5 metre satellite resolution coupled with painstaking ground verification that included measuring 9,000 trees, surveying 200 kms of road, 525 parks, medians, avenues, MRTS stations and institutions.

[5] https://www.hindustantimes.com/cities/pune-news/pmc-commissioner-presents-rs-7-650-crore-draft-budget-for-202122-101611925156420.html

[6] Institute of Tropical Meteorology (ITM)- SAFAR comprehensive emission inventory of Pune, 2016

[7] As per the State laws PMRDA is responsible for TPS within the PMR. PMC has requested PMRDA to let is planning department undertaken the TPS development within the PMC boundaries. As the TOD area plans are TPS, PMC will take the responsibility of TOD area planning and development.

[8] SMC(2019), Information Memorandum of Surat Municipal Corporation, SMC, Surat.

[9] Expenses on salaries, pensions, and other costs to operate the government establishment.

[10] 1 crore = 10 million. 1 USD = 73 Rs

[11] Bhatt et. al. Addressing flooding in the city of Surat beyond its boundaries.  October 2013, Environment and Urbanization 25(2):429-441.

[12]  Belt of land that lies between 200 ? 500 m distance from High Tide Line in the coastal areas. This is an existing built-up area and thus some development is allowed within this zone.

[13] Areas that are relatively undisturbed and those which do not belong to either category-I or II. These will include coastal zone in the rural areas (developed and undeveloped) and also areas within Municipal limits or in other legally designated urban areas which are not substantially built up.

[14] The area defined around MRT/BTS station where the increased FSI applies as per the TOD regulations.

[15] The Coastal zone regulations define the types of activities that can be taken in the coastal areas. CRZs have been classified into 4 zones for the purpose of regulation:  CRZ-I: includes ecologically sensitive areas, where no construction is allowed except activities for atomic power plants, defense; CRZ-II: includes designated urban areas that are substantially built up. Construction activities are allowed on the landward side only; CRZ-III: includes relatively undisturbed areas, mainly rural areas. No new construction of buildings allowed in this zone except repairing of the existing ones. However, constructions of dwelling units in the plot area lying between 200-500m of the high tide line is allowed;  CRZ-IV: includes the water area covered between Low Tide Line and 12 nautical miles seaward. Except for fishing and related activities, all actions impugning on the sea and tidal water will be regulated in this zone.

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[1] https://www.tandfonline.com/doi/full/10.1080/07352166.2016.1271614

[2] An enumeration block consists of 120-150 households

[3] Officiating Urbanisation CPR working paper Jan 2018.pdf

[4] Tewari, M., Godfrey. N., et al. Better Cities, Better Growth: India?s Urban Opportunity. New Climate Economy, World Resources Institute, and Indian Council for Research on International Economic Relations. London, Washington, DC, and New Delhi. Available at: http://newclimateeconomy.report/workingpapers

[5] http://documents1.worldbank.org/curated/en/373731468268485378/pdf/757340PUB0EPI0001300pubdate02021013.pdf

[6] Haque, I., and P. P. Patel, ?Growth of metro cities in India: trends, patterns and determinants?, Urban Research & Practice

Volume 11, 2018 - Issue 4.

[7] https://www.greenpeace.org/india/en/press/10991/1800-deaths-per-million-estimated-due-to-pm2-5-air-pollution-in-delhi-reveals-a-new-finding-by-greenpeace-and-iqair/

[8] Untitled-1 (iihs.co.in)

[9] https://www.nature.com/articles/s41597-021-00853-7

[10] https://www.climatelinks.org/resources/greenhouse-gas-emissions-factsheet-india

[11] https://www.pmc.gov.in/sites/default/files/miscellaneous/Carbon_Inventory_of_Pune_City_2012.pdf

[12] http://iess2047.gov.in/pathways/22202222222222220222222222201222220222222222222022202220222 22/primary_energy_overview_chart

[13] https://www.statista.com/statistics/1154532/municipal-solid-waste-generation-india-forecast/

[14]https://newclimateeconomy.report/workingpapers/wp-content/uploads/sites/5/2016/11/NCE2016_India.pdf

[15] https://www.niua.org/csc/assessment-overview.html

[16] https://drive.google.com/file/d/0B0QnHu7zF9MrenVrNHk4Q0JwSm8/view?resourcekey=0-nxFP72VFsNI4pzTTK__VJQ

[17] Bertaud and Brueckner (2003) in case of Bangalore and Bertaud (2004) in case of Mumbai have highlighted welfare losses for the city deo to draconian development control regulations.

(i)       Support to the replication cities based on the learning and experience of primary target cities

(ii)       Demonstrating the use of innovative financing solutions and business models built around the demonstration projects implemented through component 2. This will also address one of the main challenges faced by urban authorities ?Lack of local investment options for financing the implementation of integrated urban plans and actions?.

**1b. Project Map and Coordinates**

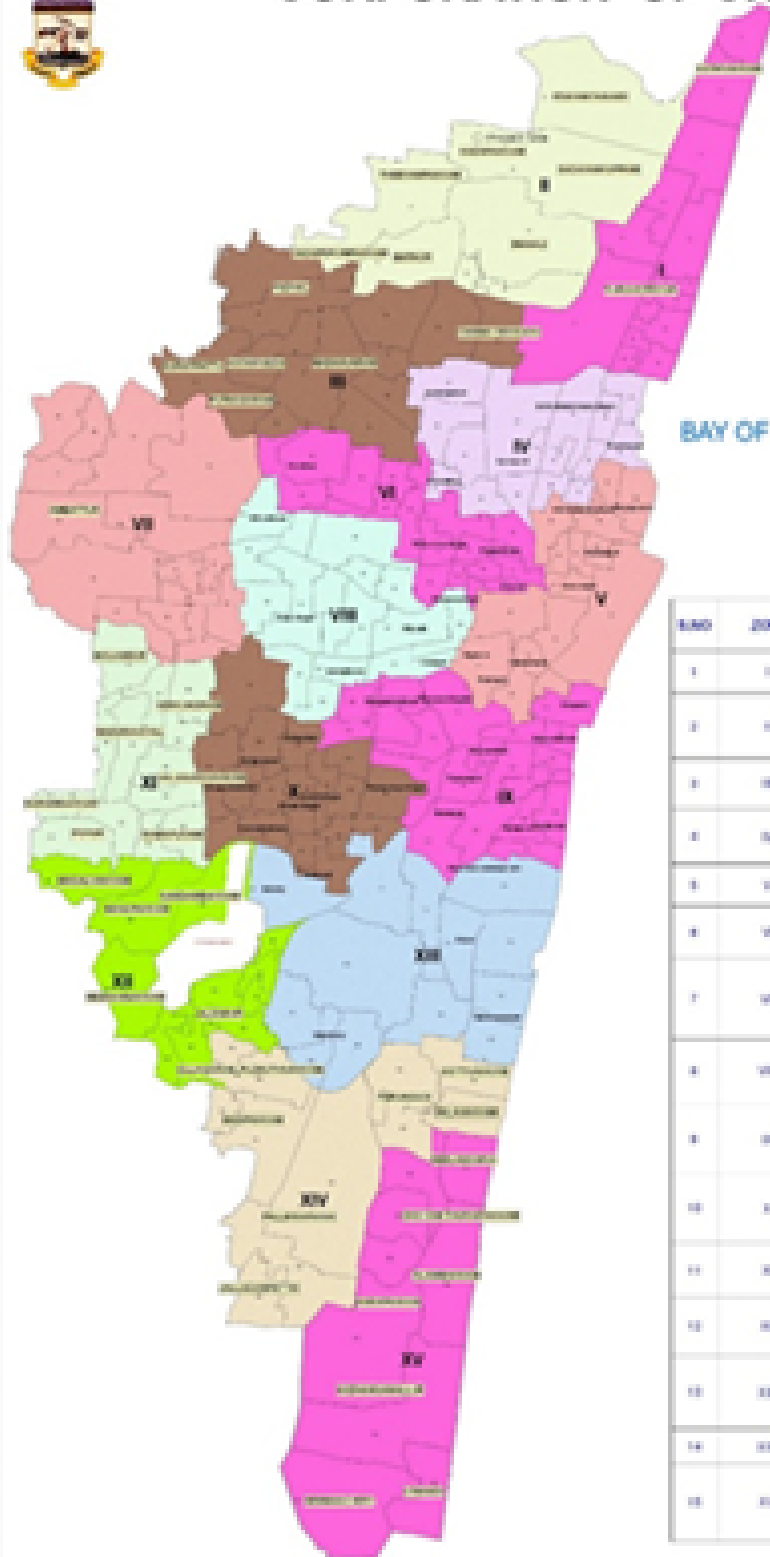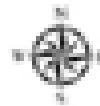**Please provide geo-referenced information and map where the project interventions will take place.**

| City | Coordinates |
|---|---|
| Chennai | Latitude 13.2031N; Longitude 80.2529E |
| Pune | Latitude: 18.5204 N; Longitude: 73.8567 E |
| Surat | Latitude: 21.1702 N; Longitude: 72.8311E |
| Replication Cities | |
| Agra | Latitude: 27.1767? N, Longitude: 78.0081? E |
| Madurai | Latitude: 9.9252? N, Longitude: 78.1198? E |
| Puducherry | Latitude: 11.9416? N, Longitude: 79.8083? E |

Maps of Primary Cities are included here and Maps of replication cities in the Annex E.
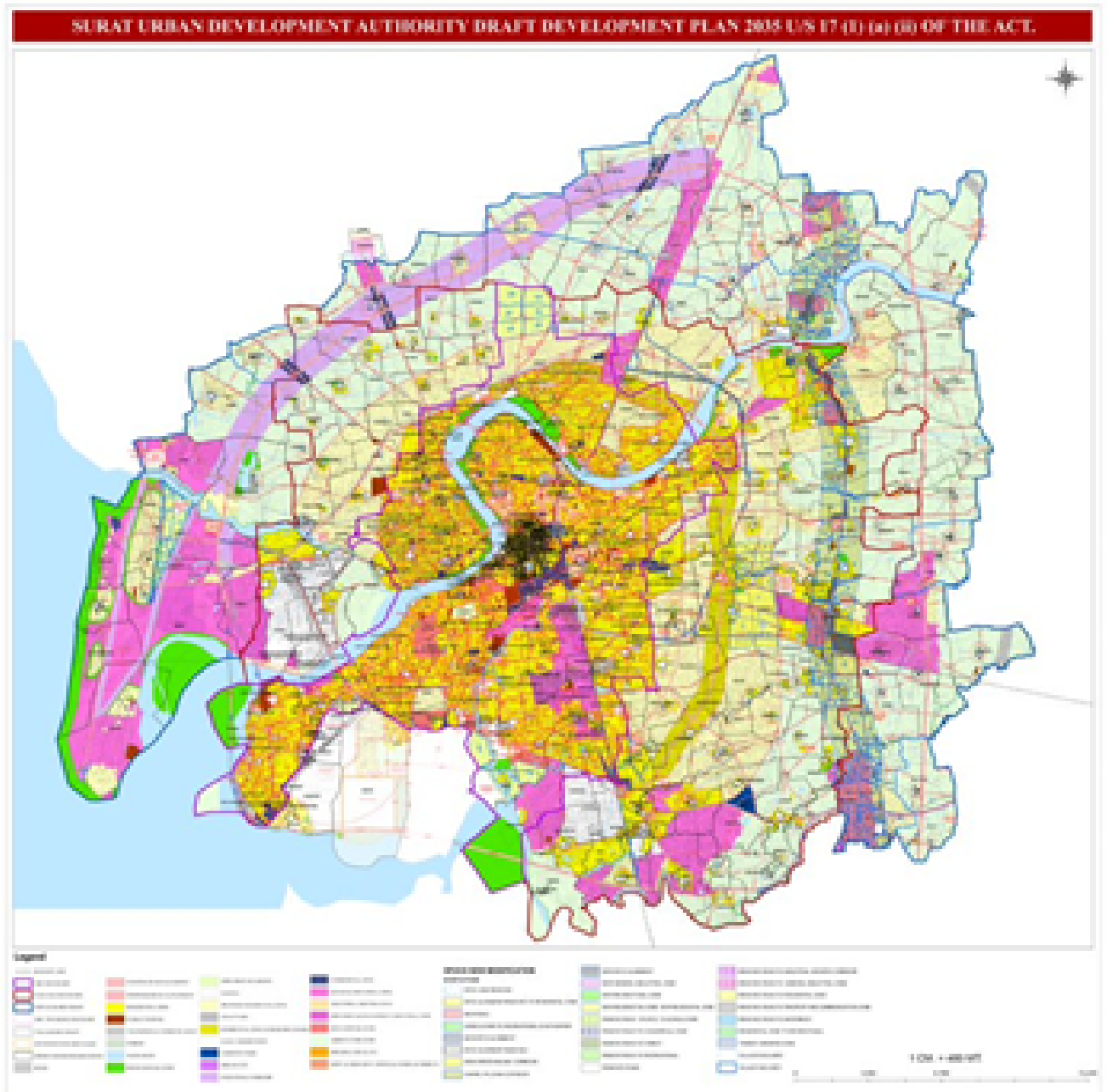
(i) Map of Chennai

# CORPORATION OF CHENNAI

BAY OF BENGAL

(ii) Map of Pune



(iii) Map of Surat

SURAT URBAN DEVELOPMENT AUTHORITY DRAFT DEVELOPMENT PLAN 2035 U/S 17 (1) (a) (ii) OF THE ACT.

**1c. Child Project?**

**If this is a child project under a program, describe how the components contribute to the overall program impact.**

The Sustainable Cities Impact Program has a two-pronged approach, that brings together investments that aim to support more integrated sustainable cities (child projects at the national level, such as the one in India), with a knowledge sharing and learning platform (the SCIP Global Platform, for which the CEO Endorsement Document was approved in August 2020**).** The aim of this impact program is to

build momentum, raise ambitions, secure commitments, and implement integrated solutions on the ground that promote behavioural change by key urban stakeholders. Through these two tracks, a virtuous and reinforcing circle emerges, where capacity development informs the implementation of more innovative, inclusive, gender-sensitive, sustainable, and integrated projects, which in turn set an example for replication within the city, country and beyond. This serves as an inspiration for others, as an outlet for knowledge and further capacity-building in its wake.

The table below highlights the key four components and outcomes of the Sustainable Cities Impact Program as well as the indicators of the impact program monitoring framework that aim to track progress at the program level. The India child project will contribute to the following programme indicators (see also annex A):

? Project component 1 will contribute to programme outcome 1, indicators 1 and 2

? Project component 2 will contribute to programme outcome 2, indicator 4

? Project component 3 will contribute to programme outcome 3, indicator 6

? Project component 4 will contribute to programme outcome 4, indicators 9 and 11

**TABLE 5 : COMPONENTS OF THE SUSTAINABLE CITIES IMPACT PROGRAM**

| Component 1 Sustainable and integrated urban planning & policy reform | Component 2 Sustainable integrated low carbon, resilient, conservation or land restoration investments in cities | Component 3 Innovative financing and scaling-up | Component 4 Advocacy, Knowledge Exchange, Capacity Building, and Partnerships |
|---|---|---|---|
| Outcome 1 Local and/or national governments have strengthened governance, institutions, processes, and capacities to undertake evidence-based, sustainable, inclusive, integrated planning and policy reform | Outcome 2 Local and national governments have undertaken sustainable integrated low carbon, resilient, conservation or land restoration investments in cities | Outcome 3 Local and national governments initiate innovative financing and business models for scaling-up sustainable urban solutions | Outcome 4 Policy making, and action are influenced at local, regional and national levels to promote sustainable and inclusive cities |
| Indicator 1 # of countries that improve enabling framing conditions to support multi-level integration and policy reform | Indicator 3 $ USD of sustainable integrated low carbon, resilient, conservation or land restoration demonstrations and/or investments [including leveraged] | Indicator 5 # of cities with enhanced access to financing for scaling-up sustainable urban solutions | Indicator 8 # of resolutions and/or commitments to advance urban sustainability and inclusiveness in high-level policy making events |
| Indicator 2 # of cities with improved evidence-based sustainable, inclusive integrated plans and processes | Indicator 4 # of cities with sustainable integrated low carbon, resilient, conservation or land restoration investment plans or project pipelines | Indicator 6 # of cities and countries that have initiated innovative financial mechanisms and/or business models for scaling-up sustainable urban solutions | Indicator 9 # urban practitioners that used the knowledge acquired from the training or materials from the SCIP GP (gender disaggregated) |
| | | Indicator 7 $ USD leveraged through the innovative financial mechanisms and business models for scaling-up sustainable urban solutions | Indicator 10 # of cities that have more ambitious environmental targets for their sustainable and inclusive integrated plans |
| | | | Indicator 11 # of cities that have shared their good practices and lessons learned with the SCIP GP |

**2. Stakeholders**

**Select the stakeholders that have participated in consultations during the project identification phase:**

**Civil Society Organizations** Yes

**Indigenous Peoples and Local Communities**

**Private Sector Entities** Yes

**If none of the above, please explain why:**

Stakeholder consultations: The table below provides the assessment of key stakeholders and their role in the project.

**Consultation for Pune**

Preparatory consultations were held with different stakeholders (PMC, PSCDCL, PMPML, MSEDCL, consultants etc). the objective of these consultations was:

? To identify the stakeholders related to the project, their interests, and their influence on the project outcomes

? Categorize and prioritise the Stakeholders that are needed to concentrate on

? To advise on the design of the project proposal and project components

? To understand the potential impact the project can have on various stakeholders

The consultations were held to provide the stakeholders with an opportunity to suggest their priorities in terms of project components, investments etc. going forward, stakeholder?s engagement will assist in ensuring all the relevant issues are addressed and that all the stakeholders are provided with a platform to voice their opinion.

Based on the discussions with various stakeholders a list of stakeholders who would be involved in the project and their respective roles in project implementation is prepared:

| Stakeholder main group | Stakeholder name | Existing activities with potential to be leveraged | Content engagement, contributions to the project (identified by Component) |
|---|---|---|---|
|  |  |  |  |

| National government | Ministry of Housing & Urban Affairs (MoHUA) | Dovetailing the project activities with the National Smart Cities Mission and AMRUT | Evidence-based sustainable and integrated planning (Component 1). Knowledge exchange and capacity development (Component 4) |
|---|---|---|---|
| | Ministry of Environment Forest & Climate Change, Govt of India | ? Inter-governmental/inter-departmental cooperation on biodiversity, enhancing and conserving environmental resources, climate change etc.<br><br>? Technical guidance and GEF oversight | Knowledge exchange and capacity development (Component 4) |
| | National Institute of Urban Affairs (NIUA), Govt of India | ? Research on integrated urban planning and transport<br><br>? Support for Capacity building and knowledge sharing on integrated urban planning | Evidence-based sustainable and integrated planning (Component 1). Knowledge exchange and capacity development (Component 4) |
| **State government** | Pune Mahanagar Parivahan Mahamandal Ltd (PMPML) | Route management, schedule EV Buses and routes, Running of EV Buses on identified routes optimizing transport | Component 1,2 |
| | Maharashtra State Electricity Distribution Company Limited (MSEDCL) | Identify best location for EV charging station, Provide Power supply to EV recharge point, support to finalizing the guidelines | Component 1, 2 |
| | Maharashtra Metro Rail Corporation Limited (MAHA-METRO) | Integrate NMT in station plans, TOD Plan and implementation, Station Area Dev Plan | Component 1,2 |
| **Local/Regional Government** | Pune Metropolitan Region Development Authority (PMRDA) | Integrate NMT in metro station plans, TOD Plan and implementation, Station Area Dev Plan | Component 1,2,3 |

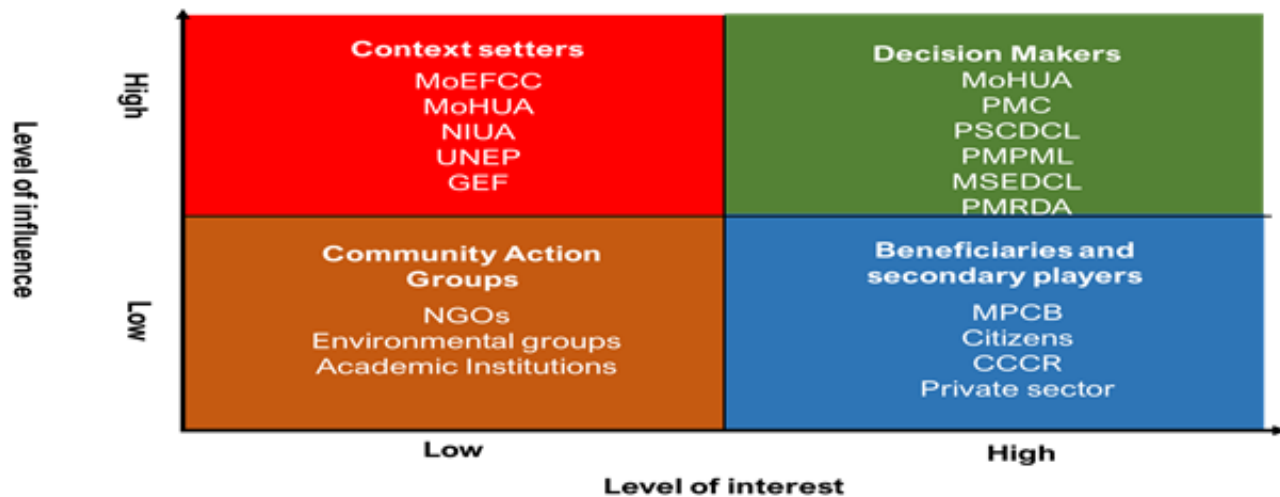| | Pune United Metropolitan Transport Authority (PUMTA) | Guidance to develop comprehensive transport model in the area and integrate in city development plan | Component 1,4 |
|---|---|---|---|
| | RTO and Transport Department | Review traffic plans, technical support | Component 1,2 |
| | Pune Smart City Development Corporation Limited (PSCDCL) | Project Management, Day to day coordination Staffing, Procurement, Reporting, Finance Accounting, conduct training, participate in capacity building programs, facilitate M&E, prepare project plan | Component 1,2,3,4 |
| | Pune Municipal Corporation (PMC) | Execution support to PSCDCL | Component 1,2,3,4 |
| | a) Road Department | Road design approvals, footpaths approval, cycling lane approval, Urban Street Design Guidelines | |
| | b) Garden Department | Convert the entire stretch into a green corridor with help of Forestry department | |
| | c) Environment Department | Clearance for the Project and Coordinate with PSCDCL | |
| | d) Planning Department | TOD Plan and implementation, Prepare Station Area Dev Plan, Integrate NMT in station plans | |
| | e) Rainbow Bus Rapid Transit (BRT) | Retrofit and Integrate NMT with existing BRT | |
| **Academia/ Training institutions** | Training institutions like Yashada | Knowledge development and capacity building partners | On-ground IEC activities for component 4 |

| Private Sector | Private sector: i) Business support organizations ii) Corporations through CSR programs | Participation in public dialogues. Leverage corporate social responsibility participation and investments based on specific proposals prepared by, and for, cities. Technical delivery and support. | Co-financing for Component 2 |
|---|---|---|---|
| NGO | World Resources Institute (WRI), C40, ICLEI | All three organizations have a presence in India, and will be tapped to coordinate with the GPSC counterparts in customizing the India Sustainable Cities Platform (ISCP) to local context | Responsibility of local coordination for proposal preparation, capacity building under component 4 |

After examination of the above table, stakeholder analysis has been carried out and a visual analysis has been prepared to determine which stakeholder will be most crucial to engage with for the project.

| Given the constraints due to Covid and resources, we used online workshops and mass emails to consult and collaborate to solicit feedback and inputs for the project from the key stakeholders. Meeting | Aim of the meeting | Participants | Technique/approach |
|---|---|---|---|
| Kick off meeting | To introduce the project and the expected outcomes of the project, scoping of the project proposals | MoHUA, PSCDCL, PMC, NIUA, UNEP | Workshop |
| Scoping Exercise | To detail out the pilot projects that should be considered for the project | PSCDCL, PMC, Environment Department, | Focus group meeting |

| Draft Proposal | To discuss the proposed project components and pilot project | PSCDCL, PMC, NIUA, UNEP, Town and country planning department, PMRDA, MSEDCL, Maha Metro, PMPML | Workshop |
|---|---|---|---|

Using interest-influence matrix, stakeholders have been classified into four categories.



Based on Mendelow's power-interest matrix

Stakeholders with high levels of interest and influence are key players. Context setters are highly influential but have little time/interest for the project. However, they may have significant influence over the success of the project. Subjects have high levels of interest in the particular project but low levels of influence. Finally, the crowd are Stakeholders who have little interest or influence on the project.

**Consultation for Surat**

Preparatory consultations were held with different stakeholders (SMC, SUDA, consultants etc). the objective of these consultations was:

? To identify the stakeholders related to the project, their interests, and their influence on the project outcomes

? Categorize and prioritise the Stakeholders that are needed to concentrate on

? To advise on the design of the project proposal and project components

? To understand the potential impact the project can have on various stakeholders

The consultations were held to provide the stakeholders with an opportunity to suggest their priorities in terms of project components, investments etc. going forward, stakeholder?s engagement will assist

in ensuring all the relevant issues are addressed and that all the stakeholders are provided with a platform to voice their opinion.

Based on the discussions with various stakeholders a list of stakeholders who would be involved in the project and their respective roles in project implementation is prepared:
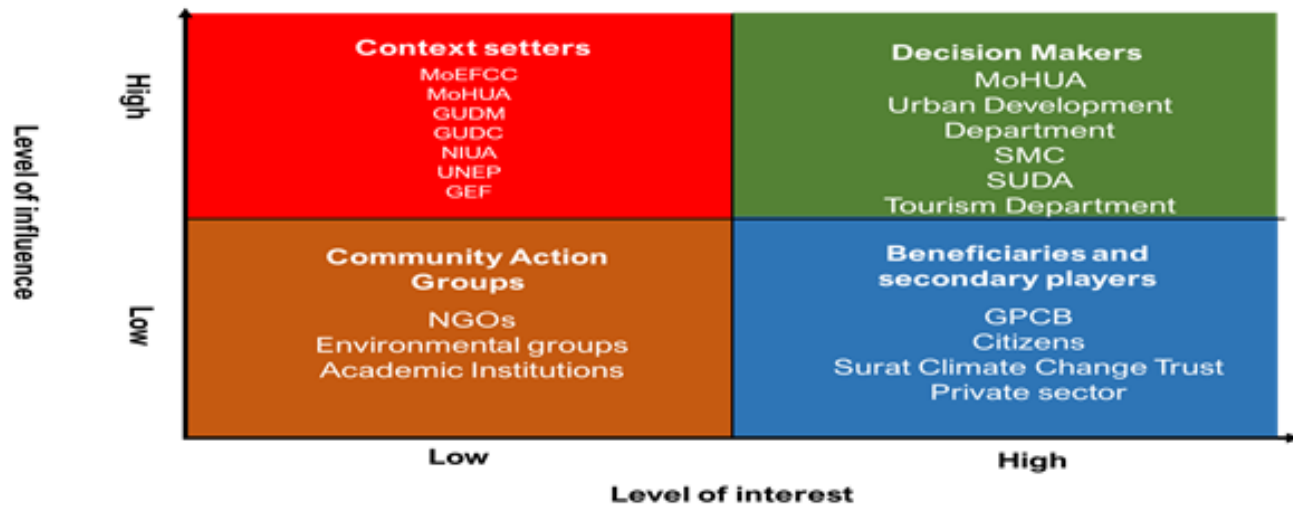
| Stakeholder main group | Stakeholder name | Existing activities with potential to be leveraged | Content engagement, contributions to the project (identified by Component) |
|---|---|---|---|
| **National government** | Ministry of Housing & Urban Affairs (MoHUA) | Dovetailing the project activities with the National Smart Cities Mission and AMRUT | Evidence-based sustainable and integrated planning (Component 1). Knowledge exchange and capacity development (Component 4) |
| **National government** | National Institute of Urban Affairs (NIUA), Govt of India | ?       Research on integrated urban planning and transport<br><br>?       Support for Capacity building and knowledge sharing on integrated urban planning | Evidence-based<br><br>sustainable and integrated planning (Component 1). Knowledge exchange and capacity development (Component 4) |
| **National government** | Ministry of Environment Forest & Climate Change, Govt of India | ?       Inter-governmental/inter-departmental cooperation on biodiversity, enhancing and conserving environmental resources, climate change etc.<br><br>?       Technical guidance and GEF oversight | Knowledge exchange and capacity development (Component 4) |
| **State government** | Urban Development & Urban Housing Department | Provides technical guidance, policy support | Component 1,3 |

| | Govt of Gujarat; Gujarat Tourism Development | ? Technical Guidance ? Project Designing& Implementation Support ? Funding support for the pilot project | Component 3 |
|---|---|---|---|
| | Gujarat Pollution Control Board | Policy and guidelines support | Component 1,2 |
| | Gujarat Urban Development Institute (GUDI) | Support for Capacity building and knowledge sharing on integrated urban planning | Component 4 |
| **Local/Regional Government** | Surat Municipal Corporation | Project Implementation and Execution Agency | Component 1,2,3,4 |
| | Surat Urban Development Authority | Planning, Project Implementation and Execution Support | Component 1,4 |
| | Khajod Urban Development Authority | Planning, Project Implementation and Execution Support | Component 2 |
| **Academia** | CEPT University | Knowledge development and capacity building partners | On-ground IEC activities for component 4 |
| **Private Sector** | Private sector: i) Business support organizations ii) Corporations through CSR programs | Participation in public dialogues. Leverage corporate social responsibility participation and investments based on specific proposals prepared by, and for, cities. Technical delivery and support. | Co-financing for Component 2 |
| **NGO** | World Resources Institute (WRI), C40, ICLEI | All three organizations have a presence in India, and will be tapped to coordinate with the GPSC counterparts in customizing the India Sustainable Cities Platform (ISCP) to local context | Responsibility of local coordination for proposal preparation, capacity building under component 4 |

| | **Surat Climate Change Trust** | | Support for Evidence-based sustainable and integrated planning (Component 1). Knowledge exchange and capacity development (Component 4) |
| --- | --- | --- | --- |
| | | | |

After examination of the above table, stakeholder analysis has been carried out and a visual analysis has been prepared to determine which stakeholder will be most crucial to engage with for the project.

Using interest-influence matrix, stakeholders have been classified into four categories.



Based on Mendelow's power-interest matrix

Stakeholders with high levels of interest and influence are key players. Context setters are highly influential but have little time/interest for the project. However, they may have significant influence over the success of the project. Subjects have high levels of interest in the particular project but low levels of influence. Finally, the crowd are Stakeholders who have little interest or influence on the project.

Given the constraints due to Covid and resources, we used online workshop and mass emails to consult and collaborate to solicit feedback and inputs for the project from the key stakeholders.

| Meeting | Aim of the meeting | Participants | Technique/approach |
| --- | --- | --- | --- |
| | | | |

| | | | |
|---|---|---|---|
| Kick off meeting | To introduce the project and the expected outcomes of the project, scoping of the project proposals | SMC, SUDA, Tourism Department Officials | Workshop |
| Scoping Exercise | To detail out the pilot projects that should be considered for the project | SMC, SUDA, Tourism Department Officials, consultants for Dumas Project | Focus group meeting |
| Draft Proposal | To discuss the proposed project components and pilot project | SMC, SUDA, Tourism Department Officials, NIUA, ICLEI, consultants for Dumas Project | Workshop |

**Consultations for Chennai**

After identifying Kadapakkam Lake as the potential project for Nature-based restoration by GEF grant the Greater Chennai Corporation empaneled M/S Landtech Engineers (P) Ltd. to prepare a detailed project report in November 2020. Under the terms of the project, the consultant was also asked to do a details reconciliation of the existing detail project report that was prepared in 2015 by DHI with funds from Tamil Nadu Urban Infrastructure Financial Services Limited (TNUIFSL) and update the same with details that are currently on the ground.

The project was sent for consideration to ADB/GEF and was appraised by the ADB team during the Pre-Fact-Finding mission conducted between Greater Chennai Corporation (GCC) officials, ADB Officials & GEF Team between 29th October 2020 ? 10 Nov 2020. This pre-fact-finding mission included appraisal for Kosathalayar basin which is an outcome under the co-financing for GEF investment. In parallel the Greater Chennai Corporation along with consultant team (M/S Landtech) conducted multiple rounds of discussion with various stakeholders like Universities, CSO?s, other Government Departments, Business Chambers & Associations to note their opinion & inputs of the projects and how they could contribute and help scale the learnings of the Nature-based Lake restoration.

A detailed public consultation to capture the input from residents in the project area was conducted in a public place in the project area with 63 residents in attendance. Their input was captured and where possible, all the suggestions were also incorporated into the design.

Subsequently, considering the COVID-19 protocols issued by the Ministry of Health & Family Welfare, Government of India, and public meetings could not be conducted. Hence, one-to-one meetings with citizens near the project area were conducted to communicate the changes based on the

input from the first stakeholder meeting. The citizen stakeholder meetings were conducted to have a well-balanced gender representation and it was made sure that all the various target demographics were consulted about the project.

ADB conducted a subsequent Fact-Finding mission to Greater Chennai Corporation (GCC) between Feb 17, 2021 & Feb 24, 2021, to clarify on many observations in the detailed project report on many areas like gender assessment, social safeguards, and design clarifications. This was clarified by GCC and their consultants. . On 09 September 2021, a validation meeting was conducted between ADB and GCC to confirm project approach, roles and responsibilities and co-financing.

**Please provide the Stakeholder Engagement Plan or equivalent assessment.**

Stakeholder engagement at Project Execution in Pune and Surat: At the project execution the stakeholders will be engaged through different modes as is described in the table below also some this description is in the section 6 on the institutional arrangements.

At the city level the engagement of the city and state entities stakeholders with jurisdiction in the participating cities will be continuously engaged through the Coordination Group (CG) to be established in each of the three participating cities. All the deliverables at the city level will be co-developed with the engagement of these stakeholders.

A knowledge management and communication specialist will be hired full-time for the project and will lead the engagement plan for stakeholders. A gender expert too will be hired and will help with the engagement of the gender groups at the city level.

In Pune and Surat, the State and the City government entities that will be closely engaged in developing the deliverables are described in each of the output descriptions. In addition to this the Civil Society organizations and academia will be engaged in the city level project work in the following ways:

(i)      The academia in Pune and Surat (CEPT University, Pune University, SNDT University, YASHADA?, GUDI) will be engaged both as technical experts in development of various deliverables to benefit from their experience as well engaged in providing trainings. They will be invited to the technical working group at the city level to seek their active collaboration. This will enable benefiting from local knowledge of these institutions as well as create capacity within city institutions to provide continuous backstopping to the city authorities.

(ii)      The city level deliverables will be finalized in close consultations with the non-government stakeholders covering civil society organizations, research institutions, gender organizations and private sector. The civil society organization will be specifically engaged, especially those working for inclusion of vulnerable groups, in developing the pilots under component 2 and development plans under component 1. The engagement will be through frequent consultation meetings at the various stages of the project development. At the beginning of the project a set of representative organizations will be identified and they will engaged with the project throughout the duration.

(iii)    The stakeholders will also be engaged in training and awareness events to ensure getting their feedback and keeping them fully engaged.

(iv)    The development of digital platform will be specially involve the academia and the the civil society organization to create a buy-in for supporting data reporting.

(v)    Private sector will be closely engaged in the component 2 and 3 activities, both for soliciting participation in the pilots as well as seeking inputs on development of innovative financing measures and business models.

Key stakeholders and their participation in the Chennai project are described in table below:

| Stakeholder main group? | Stakeholder name | Existing activities with? potential to be leveraged?? | Content engagement, contributions to the project (identified by Component)? |
|---|---|---|---|
| National Government?? ? | ?    The Ministry of Housing & Urban Affairs (MoHUA), Govt of India? | Lead executing partner, and dovetailing the project activities with the National Smart Cities Mission and AMRUT? | Evidence-based? sustainable and integrated planning (Component 1). Knowledge exchange and capacity development (Component 4)? |
| National Government?? | ?    National Institute of Urban Affairs (NIUA), Govt of India?? | Research on integrated urban planning and transport?? Support for Capacity building and knowledge sharing on integrated urban planning??? | Evidence-based? sustainable and integrated planning (Component 1). Knowledge exchange and capacity development (Component 4)? |
| National Government? | ?    The Ministry of Environment Forests & Climate Change, Govt of India? | Inter-governmental/inter-departmental cooperation on biodiversity, enhancing and conserving environmental resources, climate change etc.? Technical guidance and GEF oversight? | Knowledge exchange and capacity development (Component 4)? |

| State Government | Municipal Administration & Water Supply (MAWS) | The MAWS department of Government of Tamilnadu (GoTN) is the parent department of the Greater Chennai Corporation (GCC) and accords policy directives and budgetary support to the GCC.<br><br>MAWS is the parent department of Commissionerate of Municipal Administration (CMA) that will accord the permission for the scaling of the learnings to a secondary city. | **Component 1**: GCC level guidelines integrating flood hazard zoning with spatial plans and land use, building and development regulations<br><br>**Component 2**: Demonstration nature-based investment to restore ecosystem and climate resilience functions in Lake Kadapakkam and surrounding area<br><br>**Component 3**: Business case for ?green? nature-based urban investments developed, to increase engagement of private sector |
|---|---|---|---|
| State Government | Chennai Smart City Limited (CSCL) | CSCL is a Special Purpose Vehicle under the Greater Chennai Corporation. CSCL has funded the restoration of water bodies across the city. | **Component 1**: GCC level guidelines integrating flood hazard zoning with spatial plans and land use, building and development regulations<br><br>**Component 2:** Resilience to climate change and disaster risk strengthened in the Chennai-Kosasthalaiyar River Basin<br><br>**Component 2:** Demonstration nature-based investment to restore ecosystem and climate resilience functions in Lake Kadapakkam and surrounding area |
| State Government | Commissionerate of Municipal Administration (CMA) | CMA is the nodal department for all the corporations and municipalities in Tamilnadu except Chennai. | **Component 3:** City authorities in replication cities have access to tools, experience, sustainable investment framework based on demonstration work in main target cities (e.g., Agra, Puducherry, Madurai,) |

| State Government | Public Works Department (PWD) | The PWD maintains larger water bodies and rivers in the state of Tamilnadu. | **Component 2:** Demonstration nature-based investment to restore ecosystem and climate resilience functions in Lake Kadapakkam and surrounding area<br><br>**Component 3:** City authorities in replication cities have access to tools, experience, sustainable investment framework based on demonstration work in main target cities (e.g., Agra, Puducherry, Madurai,) |
|---|---|---|---|
| Research NGO working in Climate Change | World Resources Institute (WRI), C40, ICLEI? | All three organizations have a presence in India, and will be tapped to coordinate with the GPSC counterparts in customizing the India Sustainable Cities Platform (ISCP) to local context? | Responsibility of local coordination for proposal preparation, capacity building and?? |
| Academia | ? Anna University<br><br>? Indian Institute of Technology (IIT<br><br>? CEPT University<br><br>? Pune University?<br><br>? SNDT University<br><br>? YASHADA?<br><br>? GUDI ) | The restoration will connect to leading universities and research institutes where the CBOs have existing contact, to explore how to use their existing curricula material and training offers (as and where available), and in turn, provide them<br><br>with an opportunity to provide input into the development of the knowledge products. Synergies could be created e.g. with Summer Schools and online training offers and they could be special invitees to the Lake Management Committees. | Component 1<br><br>GCC level guidelines integrating flood hazard zoning with spatial plans and land use, building and development regulations<br><br>Component 2: Demonstration nature-based investment to restore ecosystem and climate resilience functions in Lake Kadapakkam and surrounding area |

| | | | |
|---|---|---|---|
| Academia | Government School | The Government school is near the project area (within 2km).<br><br>They would be actively involved in knowledge and capacity building activities.<br><br>Many of the children studying in this school are from the project area. Capacity building of these students and teachers would help in the long-term sustainability of the project. | **Component 2:** Demonstration nature-based investment to restore ecosystem and climate resilience functions in Lake Kadapakkam and surrounding area<br><br>**Component 4**: Indian City stakeholders? capacity and awareness enhanced to undertake integrated sustainable urban development addressing climate change, biodiversity and land degradation challenges. |
| Business associations, private sector and financial initiatives | CREDAI | Confederation of Real Estate Developers? Association of India (CREDAI) National, is an apex body representing and uniting the Developers fraternity across the nation.<br><br>CREDAI works closely with GCC in restoration of lakes in Chennai. | **Component 3:** Business case for ?green? nature-based urban investments developed, to increase engagement of private sector |
| Business associations, private sector and financial initiatives | Smart Bike | Smart Bike is the public bicycle share system operator in Chennai city.<br><br>GCC will work with Smart Bike to provide for Biking Solutions after the restoration is complete. | **Component 2:** Demonstration nature-based investment to restore ecosystem and climate resilience functions in Lake Kadapakkam and surrounding area |
| Business associations, private sector and financial initiatives | Toorque India | Toorque India(TI) is the on-street parking solutions provider for GCC.<br><br>GCC will work with TI to provide parking facilities at the project location. | **Component 2:** Demonstration nature-based investment to restore ecosystem and climate resilience functions in Lake Kadapakkam and surrounding area |

| Business associations, private sector and financial initiatives | Confederation of Indian Industries | The Confederation of Indian Industry is a non-governmental trade association and advocacy group. CII engages business, political, academic, and other leaders of society to shape global, regional, and industry agendas. It is a membership-based organisation. | **Component 2:** Demonstration nature-based investment to restore ecosystem and climate resilience functions in Lake Kadapakkam and surrounding area

**Component 3:** Business case for ?green? nature-based urban investments developed, to increase engagement of private sector |
|---|---|---|---|
| Multilateral development banks | World Bank | As a leading global financial institution, GCC will collaborate with the World Bank to be part of the high-level investment roundtables for future scaling of the action. The WB will be introduced to cities projects that have high-potential to become bankable and have a strong resilience focus.

Urban finance experts will be invited as speakers and facilitators to the Finance modules at the various capacity building activities..

WB case studies, and knowledge products will be used in capacity building activities and library of knowledge | **Component 3:** Business case for ?green? nature-based urban investments developed, to increase engagement of private sector |

| Bilateral development banks | KfW | As a leading global financial institution, GCC will collaborate with the KfW to be part of the high-level investment roundtables for future scaling of the action. The KfW will be introduced to cities projects that have high-potential to become bankable and have a strong resilience focus.<br><br>Urban finance experts will be invited as speakers and facilitators to the Finance modules at the various capacity building activities..<br><br>KfW case studies, and knowledge products will be used in capacity building activities and library of knowledge | **Component 3**: Business case for ?green? nature-based urban investments developed, to increase engagement of private sector |
|---|---|---|---|
| Private Sector? | Private sector: i) Business support organizations ii) Corporations through CSR programs | Participation in public dialogues. Leverage corporate social responsibility participation and investments based on specific proposals prepared by, and for, cities. Technical delivery and support.? | Co-financing (Component 3)? |
| City networks and initiatives | 100 Resilient Cities Network | GCC is already a 100RC cities and has access to some global best practices on nature-based solutions | **Component 3:** Business case for ?green? nature-based urban investments developed, to increase engagement of private sector |

| City networks and initiatives | Michelin Cities Network | The International Network of Michelin Cities was launched in 2014. The aim of this network is to develop public and private partnerships between around fifty cities all over the world sharing the common feature of being home to a Michelin production or research center, as well as their partner cities.<br><br>This project is a powerful driver for innovation in public policy. It addresses the issues of internationalization and attractiveness of the territories. It signals the dawn of a new kind of cooperation between cities, and is completely in line with 21st century concerns, such as those of COP21 and the Habitat 3 conference. | **Component 3:** Business case for ?green? nature-based urban investments developed, to increase engagement of private sector |
|---|---|---|---|
| City non-government organizations | Care Earth Trust | The Care Earth Trust is working with GCC in restoring water bodies across the city.<br><br>Their best practices and the knowledge gained from this Nature based restoration can be exchanged and scaled-up for further activity. | **Component 1:** Green infrastructure design manual including rainwater harvesting developed.<br><br>**Component 2:** Demonstration nature-based investment to restore ecosystem and climate resilience functions in Lake Kadapakkam and surrounding area |
| City non-government organizations | Environmentalist Foundation of India (EFI) | Environmentalist Foundation of India (E.F.I) is a wildlife conservation and habitat restoration group.. E.F.I works out of 14 Indian states. Has done may water body restorations in the region. | **Component 1:** Green infrastructure design manual including rainwater harvesting developed.<br><br>**Component 2:** Demonstration nature-based investment to restore ecosystem and climate resilience functions in Lake Kadapakkam and surrounding area |

| City non-government organizations | Arunodhaya Centre for Street and Working Children | A Nonprofit foundation working among children and women in the project area.<br><br>They assist capacity building among communities. | **Component 2:** Demonstration nature-based investment to restore ecosystem and climate resilience functions in Lake Kadapakkam and surrounding area<br><br>**Component 4:** Indian City authorities and stakeholders have access to knowledge, tools, best practice examples through a National Sustainable Cities Platform<br><br>Indian City stakeholders? capacity and awareness enhanced to undertake integrated sustainable urban development addressing climate change, biodiversity and land degradation challenges. |
|---|---|---|---|
| City non-government organizations | NEELAM Trust<br><br>Village Education Women Children Rehabilitation Society (VEWCRS) | A Nonprofit foundation working among children and women in the project area.<br><br>They assist capacity building among communities. | **Component 2:** Demonstration nature-based investment to restore ecosystem and climate resilience functions in Lake Kadapakkam and surrounding area<br><br>Component 2: Indian City stakeholders? capacity and awareness enhanced to undertake integrated sustainable urban development addressing climate change, biodiversity and land degradation challenges. |

| City non-government organizations | Don Bosco Anbu Illam (DBAI) | A Nonprofit foundation working among children and women in the project area.<br><br>They assist capacity building among communities. | **Component 2:** Demonstration nature-based investment to restore ecosystem and climate resilience functions in Lake Kadapakkam and surrounding area<br><br>**Component 4**: Indian City stakeholders? capacity and awareness enhanced to undertake integrated sustainable urban development addressing climate change, biodiversity and land degradation challenges. |
|---|---|---|---|
| International NGO | The Nature Conservancy Trust | The project will benefit from the knowledge and experience of TNC and its partners (ie IUCN) in the design and implementation of NbS.  It will also make linkages with the recent TNC restoration of Sembakkam Lake in Chennai. | **Component 2:** Demonstration nature-based investment to restore ecosystem and climate resilience functions in Lake Kadapakkam and surrounding area |
| City non-government organizations | HCL Foundation | The foundation works closely with GCC for funding many water body restorations in the Chennai Metropolitan Area. | **Component 3:** Business case for ?green? nature-based urban investments developed, to increase engagement of private sector |

In addition, provide a summary on how stakeholders will be consulted in project execution, the means and timing of engagement, how information will be disseminated, and an explanation of any resource requirements throughout the project/program cycle to ensure proper and meaningful stakeholder engagement

**Select what role civil society will play in the project:**

**Consulted only;**

**Member of Advisory Body; Contractor;** Yes

**Co-financier;**

**Member of project steering committee or equivalent decision-making body;**

**Executor or co-executor;**

**Other (Please explain)**

**3. Gender Equality and Women's Empowerment**

**Provide the gender analysis or equivalent socio-economic assesment.**

Gender analysis:

The goals of Gender Equality and Women?s Empowerment (GEWE) are now universally accepted as fundamental to the achievement of all the Sustainable Development Goals (SDGs). Unfortunately, high levels of persistent gender discrimination existing in the country has to led to India ranking 95th out of the 128 countries on the SDG Global Gender Index released in June 2019 (Equal Measures 2030, 2019). With a score on only 56.2 India is considered to have fared ?very poorly? on the index especially on the SDG 51, which is a stand-alone gender equality goal. The score of 57 on the index in relation to its performance on gender in relation to SDG 11, ?*make cities and human settlements inclusive, safe, resilient and sustainable*? was also similarly rated.

This is despite the fact that the progress on this goal being the fastest in recent years. As per the Niti Aayog SDG India Index, 2021 report, the national SDG 11 index score increased from 53 in 2019-20 to 79 in 2020-21. Gender equality goal (SDG 5), however, is still a concern even in some of the highly urbanised states like Gujarat and Maharashtra with scores of 49 and 51 respectively.??

There is an urgent need to move towards more gender responsive development planning and investments, if India has to achieve a turn-around in this status by 2030. Enabling this, requires a comprehensive gender assessment of our cities and towns, identifying the differential experiences of men and women- across all ages, classes, ethnicity, (dis)ability, occupations, and residence.

Unfortunately, updated gender and sex-disaggregated data availability at city level is very limited. However, a review of available statistics highlights the following challenges to gender equitable urban planning and development in India:?

1.    **Persistent and high levels of existing gender discrimination in the society** most predominantly revealed in the adverse child sex ratios and the sex ratio at birth, but also in the low levels of female education (less than half of female population aged 15 to 49 years has more than 10 years of schooling), health and nutrition (high prevalence of anemia levels among women and significant

gender gaps in male and female anemia levels), increasing gender-based violence especially in public spaces.?

2. **Improving access to basic amenities and services but non-reliability of supply and quality continues to increase women?s time poverty due to existing gender roles.** Even today in most cities, women and girls have the major responsibility of care work within the households. With increased investments in infrastructure for basic services especially water, sanitation, electricity, cooking fuel, health and education services, the burden of women?s work has definitely decreased. However, quality, reliability and affordability remain a concern, especially impacting women from poorer communities. For example, while water supply systems have been established, irregular water supply often results in women and girls missing work or schools.??

3. **Mobility and safety concerns in cities further exuberate gender inequalities as women are deprived of access to education and employment options.** A basic necessity for urban women is the availability of affordable, safe and convenient public transport facilities. However, while the share of public transport is around 47% in cities with population above 5 million, it is very low in case of cities with a population of 2 to 5 million (12%), small cities with a population of 0.5-1 million (9%) and cities with a population 1-2 million (13%) (MoHUA, 2019). It also needs to be mentioned here that contrary to global trends the %age of men using public transport at 66% is higher than the 59% of women using public transport in urban India. A key reason could be that only 12% women in the country consider it safe, while 88 % of women felt that public transport was only somewhat safe, somewhat unsafe and safe except at night (Ola Mobility Institute study, 2019).?

4. **Women and girls are also more vulnerable to climate impacts**, **but often the last to be included in urban climate resilience plans**. Sea-level rise, extreme precipitation events, increased flooding and inundation, are recognised as having a more pronounced impact on women?s lives and livelihoods as compared to that of men. For example, women home-based workers often loose both their place of work and material during water logging, but these losses are hardly ever included in flooding evaluations. This coupled with lack of access to social protection measures and/or insurance, leaves them most vulnerable during urban flooding situations- something which is common across the project cities.? Similarly, power outage and high costs of electricity, coupled with increasing urban heat island affect, tend to impact women home-based workers. Field reports (Mahila Housing Sewa Trust, 2015) have shown that increasing heat stress and water logging could reduce their productivity by up to 30%.?

5. **All the above, coupled with limited access to financial resources and productive assets contribute to very low urban female labour force participation rates (LFPR).** As per the Periodic Labour Force Survey 2018-19, female LFPR for those above 15 years was only 20.4% in urban India as against 74.5% for urban males in the same age-group. The urban female LFPR in both the project states, Gujarat (13%) and Maharashtra (16.8%) is also extremely low (IWWAGE, 2020).

While some of the above may be attributed to the existing socio-cultural norms on gender which restrict women?s mobility and participation, much of these also translate from **the existing ?male-bias? in Urban Development plans and programmes** which fail to take into account gender considerations of safety, accessibility, care roles, etc. Unless gender considerations are taken into

account while planning, designing and implementing urban projects, there is a high probability of women and girls not benefitting or even worse being negatively impacted by the development, thereby increasing the gender gaps.

Traditional transport planning practices, for example, are based on broad origin and destination pairs built on male commuting patterns. A WRI study in Bhopal has highlighted how only 60% of the total trips made by men are work trips and the figure is further lower with work trips for women being only 33%. Furthermore, more than 60% of men generally tend to travel from an origin to a destination, without any trip chaining. Around 50% women undertake multiple activities per trip, leading to multiple stops. Women also tend to travel more with dependents than their male counterparts. More than 30% of the women, surveyed in the WRI study, responded that they tend to travel with dependents, with only 16% of men responding they do so.

Similarly, gender differentials can also be observed in preferences in choice of mode of transport. The study by Ola Mobility Institute, reported that women constitute only around 38 % of bus users and 35 % of metro/train users, while they are 40-45 % of auto-rickshaw, on-demand taxi and shared public transport users. This may be due to the convenience offered by these services, especially for short travel distances which suits trip chaining needs of women.?

Again while 95% of the female respondents considered environmentally sustainable modes of transport important, yet only 4 % preferred non-motorized transport. This could be linked to their perception of the street environment- 57% women perceived that there were either no footpaths or that they were discontinuous or encroached upon. Women want streets to be improved, with 74% stating that footpaths and 68 % stating that cycle tracks are required in cities.

The study also reported that around 2 million women walk 2-5 kilometres every day, distances that could be covered in half the time by cycling. Women?s reasons for not cycling included insufficient cycling infrastructure (32 %), that it was not convenient (27 %), not safe (20 %) and both of the above (21 %).

Following traditional practices will thus lead to limited needs of mainly one (male) gender being addressed, putting women and transgenders at a greater risk of reduced access to mobility and other disparities. **Undertaking gender analysis** to map and understand these differences and incorporate them into policies, plans and projects, is thus highly important not only from an equality and inclusion perspective but also to efficiently address the issue at hand.

Enabling this requires **institutionalisation of gender mainstreaming practices and processes** across the board at the city level- through inclusion of gender expertise/gender cells, stakeholder consultations with women, adoption of gender responsive planning and budgeting processes and mandatory gender assessment of all urban development projects. However, more importantly it requires providing **capacity building and knowledge support** on gender considerations within urban development especially for the technical team and elected representatives within the city bodies. Furthermore, this knowledge cannot be limited to theoretical sensitization but has **to emerge from ?practice?** bringing in a clear understanding of the implementation bottlenecks and strategies to overcome those. Once such

model of gender-responsive solutions are established they would become critical to accelerate the process of gender mainstreaming in urban governance across the country.?

Keeping this in mind, the project will follow a three-pronged strategy to gender mainstreaming.??

1.  Generating data and mapping the gender implications at the city level especially for transit-oriented development, sustainable mobility and climate resilience planning.?
2.  Pilot gender-responsive practices and solutions and take forward the learnings from these demonstration for integration within the city-level institutional set-up; and?

3.  Provide technical and capacity building support to the project cities as well as other cities across India through a national platform for promoting gender responsive urban governance.

Gender Action Plan?

Towards this, the project has developed a detailed Gender Action Plan which will guide the gender mainstreaming approach and strategies.??

**Component 1: Evidence Based Sustainable Cities Impact Program?**?

**Outcome 1: Key stakeholders in target Cities  adopt evidence-based sustainable and integrated city development planning approaches**

The most critical evidence gaps in enabling sustainable and integrated city development plans is the lack of sex-disaggregated data and information on gender dimensions of urban development. Men and women experience city lives differently, given the existing gender norms and societal patterns. Unfortunately, city data collection, often driven by economic infrastructure development, fails to calculate the human development and care needs of the urban citizens- a burden which then gets placed on women and girls.

Many city development plans which are infrastructure oriented also have a ?white collar male bias? often overlooking the concerns of the poor- especially those living in informal settlements and involved in informal livelihoods. Women and girls from these communities end up bearing the dual burden of discrimination- being overlooked due to the assumed gender neutrality of urban development programmes as well as limited inclusion of concerns of informal settlements and informal economy in urban planning. The same also applies to other marginalised groups especially the elderly and (dis)abled, as accessibility is often not a prime factor in city planning.

The project will thus focus on collection of sex-disaggregated data and that on gender parameters which will include among other data on;??

?  Basic Amenities- water supply and sanitation systems, electricity and fuel centres, child care centres (AWC), schools, hospitals, public toilets, etc?

? Education- mapping of institutes of secondary, higher secondary and college education, %age of services that are accessible within a fifteen-minute walk, commuting routes of students, etc.?

? Employment- place of work (including markets) dominated by women, %age of jobs that are accessible within a fifteen-minute walk, job commuting routes of women, etc.?

? Transport-people near transit, mode shares and preferences, median trip time and cost, key routes frequented by women, etc.?

? Safety- street lighting, safe pathways, areas/ routes prone to violence and harassment.?

? Climate vulnerability- impact of water supply, shelter locations and transfer routes, reproductive and child health services, coastal livelihoods, mangrove plantations, etc.

Women will be adequately represented and included in all data collection efforts?dedicated surveys, time-use diaries, gender audits, focus groups discussions, and spatial mapping techniques, to understand latent demand. The project will also explore innovative means and technology solutions (social media analysis, digital ticketing data, etc.) apart from primary data collection. The data will be geo-references, wherever possible and converted into a ?Gender Layer? and a gender analysis dashboard will be developed which can be used by the ICCC centres and other stakeholders in the planning process. The capacity building programme under output 1.1.5 will also include training officials on using the gender layer for gender responsive infrastructure planning.

The gender data will be further disaggregated by income, class, and ethnicity, among others, is also critical to understanding the differences experienced by women. The information will then be collated with existing sex-disaggregated data to develop a ?Gender Just Smart City Report? for Pune and Surat, which will identify gender work, time and resource use patterns and develop an institutional responsibility and accountability map for gender-responsive planning and development. This report will be used as the base to facilitate the state-level dialogue and inter-agency collaborations on gender concerns as part of the overall technical support being provided by the project.

The project also recognises that stakeholder consultations often fail to involve women from across the board as a key participant in the participatory planning and public consultation processes. Most city officials as well as urban planners have a limited understanding on gender-based vulnerabilities especially the needs and concerns of women and girls. This often results in city-development plans being considered as ?gender neutral? in nature and assumed to be targeting the needs of all residents of the cities. To address this, the project will undertake focused stakeholder consultations in both cities with women and transgenders from across- all classes, castes, age-groups, residence (including slums and informal settlements) and work groups (including City Officials, Planners, Academics, Researchers, Formal and Informal Workforce and Home-makers) for mapping their priorities and preferences in urban infrastructure especially those being developed by the project.

The gendered information emerging from the data collection, report and consultations will be used to ensure that gender mainstreaming is integrated across all templates, protocols, strategy documents, guidelines, policies and plans developed by the project.

**Component 2: Investments in low emissions, resilient and nature-based solutions**

**Outcome 2: Key stakeholders in target cities apply tools, knowledge and experiences to develop sustainable investment projects for low-emission resilient Urban development**

To promote more innovative and gender responsive design and planning, the technical support team will include a gender expert, who will guide the investment preparation process and undertake a detailed gender appraisal of the design/ plan and gender assessment of the implementation process for both the projects.??

Also, to ensure that gender is not a stand-alone responsibility, the gender roles and responsibilities of all stakeholders will be clearly assessed as part of the smart-city report. The key stakeholders (including city officials) as well as the project technical team will be trained on gender sensitization and gender responsive planning before the planning and designing process begins. There will be specific focus on capacity building on transport agencies and departments on safety of women and using a gender lens to understand and plan urban mobility systems. Gender sensitization programme will be conducted for field staff who will be directly involved with women and girls eg. drivers, conductors, ticketing officials in BRTS; supervisor at bike sharing site.?

The pilot project planning will also include the development of a project specific Gender Action Plan which will specifically focus on the critical implications for women in the cities:?

1.  **SURAT:**??
a.    In low emissions mobility planning and green corridor development, there is a specific need to understand gender concerns and as far as possible accommodate gender and other social parameters to provide a more accessible and equitable mobility plan in the alternative scenario planning.?

b.    PBS and NMT understand people?s perception and barriers towards adoption of NMT especially that for women and LGBTQI communities and plan for the same.?

2.  **PUNE:**??

a.    Transit oriented development to explore mix use planning and co-locating of services like child care, health care, grocery stores and markets.?

b.    BRTS station plan to be reviewed from a gender lens through conducting a mock gender audit of the station design for developing a gender responsive design.?

3.  Chennai

a.    Rejuvenation of Kadappakam Lake complex.

The project will address these by incorporating at least one specific gender component in the design. The options to be explored will include but not be limited to the following:?

? Dedicated facilities for women, girls, elderly, (dis) abled, etc. during peak hour rush.?Exploring new designs for bikes with greater carrying capacity, whether it be children or raw material, within bike share systems.?

? CCTVs, Emergency call buttons, etc. at public transport stations, parking points, pedestrian pathways and cycling tracks.?

? Providing space for placing goods inside the vehicle/carriage.?

? Include spaces for drop-off and pickup that are well lit and safe, dedicated parking space for women and girls especially those using bikes.?

? Training programme and awareness building measures to encourage women and girls towards usage of bikes.?

? Public toilets should be available at major interchanges, and along cycle routes.?

? Exploring natural and night lighting solution combos for ensuring safety in the cycling tracks and biodiversity zones.?

? Creating unobstructed, sufficiently wide, safe sidewalks and crosswalks that are accessible by all users.?

? Well-lit, universally accessible stops and stations for public transport, with information and communication at each stop??

? People with strollers, walking assisted tools, and wheelchairs should all be able to easily access buses and rail cars, as well as stations.?

? Gender friendly fare policies like reduced off-peak rates that allow for trip chaining and multi-stop journeys more easily.?

? Encourage a mix of uses and activities that allows women to access local services and employment opportunities near their residences.??

? Encourage transit stops and stations to co-locate local services, like childcare, health services, fitness centers, grocery stores, and markets.??

? Preference to women/ women?s groups in all market/ entrepreneurship related activities, linked with credit support and skill training.?

With transition to sustainable mobility, the sector will need to transition workers to the new economy. It is important to ensure entry points for new workers, including women, LGBTQI, persons with disabilities, etc. The project will promote women and other social groups in staff as well as leadership roles within the sector with recruitment targets and skill training facilities. A standard clause for ensuring equal remuneration and employment benefits for women, as mandated by law, will also be developed and included in all construction as well as other contracts.?

The following table gives specific areas where women representatives and groups will be engaged with in rejuvenation project.

| Activities | Linked Output in Results Framework | | Responsibility |
|---|---|---|---|
| 1.1 Consult community members, including women in rejuvenation of Kadappakkam lake complex | **Output 2.1.2**<br><br>Lake Kadapakkam water body restoration and public recreation area established through nature-based approach | 1. women, consulted and views incorporated in the design of the nature- based area development plan to rejuvenate Kadappakkam lake. | GCC |
| 1.2 Create awareness among community members, especially children on need for preservation of water bodies | **Output 2.1.3**<br><br>Knowledge, communications and learning advanced for local communities and government bodies | 1. Awareness generation programs (slogan writing/poster painting competitions etc) in schools around the lake complex. These (posters which win prizes) can be displayed in the library proposed at the complex.<br><br>2. Walks organised around the lake complex to create awareness about the lake?s ecosystem1. Local community members/school children of local government school could be trained in conducting these walks.<br><br>3. IEC activities with local community members. Experts can involve community members in preparation of IEC brochures and pamphlets. | GCC, LMC |

| | | | |
|---|---|---|---|
| 1.3 Integrate community safety features and EWCD friendly design features in lake complex | **Output 2.1.2**<br><br>Lake Kadapakkam water body restoration and public recreation area established through nature-based approach | 1. Community safety features integrated in design and construction of Kadappakkam lake complex.<br><br>2. Crime prevention through environmental design (CPTED)ii features integrated in the design of Kadappakkam lake complex.<br><br>3. EWCD features integrated in the design of Kadappakkam lake complex.<br><br>4. Separate well-lit toilet(s) for women and men and all-gender toilet(s) with disability friendly access to cater to the disabled and transgenders built at Kadappakkam lake complex. | **GCC** |
| 1.4 Employ women and marginalised groups in construction and maintenance and ensure their representation in lake management bodies | **Output 2.1.2**<br><br>Lake Kadapakkam water body restoration and public recreation area established through nature-based approach | *1.* Maintenance contract for Kadappakkam lake complex includes a clause to ensure women and marginalized groups are employed.??<br><br>*2.* Opportunities identified for women and marginalized groups to be trained in water hyacinth (Eichornia crassipes) related crafts.?<br><br>3. At least 20% of the Lake Management Committee comprises women and vulnerable groups | **GCC** |
| 1.5 Ensure women and marginalised groups benefit from tourism related activities | **Output 2.1.3**<br><br>Knowledge, communications and learning advanced for local communities and government bodies | 1. 40% of those trained and employed as tour operators/guides are women and PwD (employment of one transgender person)<br><br>2. Alternative livelihoods for the local poor from tourism potential of lake complex: prioritise PwD and transgenders. | **GCC** |

**Component 3: Innovative financing solutions for cities**

**Outcome 3: Target cities increasingly adopt innovative financing solutions and business models to scale up green urban solutions**

Promoting Public Private Partnership based business models without focus on gender-inclusion could lead to women being left out of the project benefit sharing. It is important to sensitize all the concerned public and private sector partners for working towards a more gender-equitable business model. This would be especially important while ensuring that women who are part of the workforce in the projects are provided with decent work options and employment benefits (childcare, maternity leave, etc) as mandated by the law. To enable this, gender equity mandates will be institutionalized within the implementation mechanisms for the innovative financing and business models through promotion of gender budgeting.

Even though the Government of India has officially adopted Gender Budgeting (GB) as a tool for gender mainstreaming, most cities (municipal bodies) have not been able to apply the same in their work (except for Pune and Mumbai to some extent). This is mainly due to lack of awareness, capacities as well as knowledge products. The project will promote adoption of gender budgeting by cities to ensure that infrastructure projects are responsive to gender concerns but will also potentially result in gender-responsive urban development across the board. GB has already been adopted in Pune, which will be strengthened, while Surat will be encouraged to adopt GB.??

All operational guidelines, feasibility reports, approach papers, related to financing and business case development to include gender and care work parameters.  To enable this, the project gender team will develop a checklist for assessment of gender responsiveness of budget allocations, projects and partners. This checklist will be tested in the pilot demonstration project and across all financial instruments being developed. The checklist will be developed keeping in mind gender and care work concerns and the need to not assume women?s unpaid work and care roles as given. However, care will also be taken to ensure that the business care development with gender perspective does not compromise the PPP viability of the project.

Component 4: Knowledge exchange and capacity development

Outcome 4: Increasing number of Indian City authorities and stakeholders use the knowledge, tools, best practice examples, made available on  National Urban Learning Platform (NULP), hosted by NIUA, and linked to UrbanShift, to develop and implement integrated sustainable development plans and investments.

City practitioners and stakeholders across India have a limited understanding of gender, and even lesser understanding on how to mainstream gender into urban project designs and plans. While generic gender training manuals and knowledge products are available, customised products especially those related to infrastructure development are not so easily available. Also, more often these are in-principal processes not always backed by case studies on government-led projects. This further hinders the adoption of gender-responsive actions across all urban development projects. The project will thus focus on documenting the learnings, challenges, and achievements of its gender-responsive actions, and develop detailed case-studies on gender-responsive actions. These learnings will be used as a base to modules on gender inclusion in sustainable mobility, coastal area development and nature-based solutions. The module would mandatorily be introduced across all training, workshops and online

events related to the project- whether for primary city communities, officials from secondary cities, or state-level workshops/seminars.

A dedicated section on gender inclusion will also be created in the NULP to highlight the project?s gender actions, achievements, learnings, and challenges. The aim would be to disseminate project actions and findings on gender and to orient city practitioners and stakeholders from across India on gender-responsive urban project planning. Further to build capacities of city officials, on gender responsive planning and budgeting, training programmes on the same will be organised.

**Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment?**

Yes
**Closing gender gaps in access to and control over natural resources;**

**Improving women's participation and decision making** Yes

**Generating socio-economic benefits or services or women** Yes

**Does the project?s results framework or logical framework include gender-sensitive indicators?**

Yes
**4. Private sector engagement**

**Elaborate on the private sector's engagement in the project, if any.**

The project is engaging the private sector in a variety of ways:

?      The private sector will participate in the design of pilot interventions and the planning processes for development of city plans, thus ensuring that their needs are considered and that they are aware of the opportunities and priorities of the government and civil society;

?      Public transport and non-motorized fleet operations will benefit from the project?s demonstrations and other supporting actions (such as the plans in component 1) which aim to prioritize and enhance public transport services. For instance, in Pune the pilot low-emission resilient green corridor will integrate in the Station TOD Area green NMT infrastructure along with EV charging infrastructure. In Surat, a public bike sharing will connect the public transport node at the coastal TPS with the Dumas beach recreational facility where the private sector will be engaged for designing as well as investing in the services.

?      Private companies in the GIS sector will participate in the development of the integrated planning platforms developed or strengthened in Pune and Surat. They will also benefit from an increased demand for GIS-related services by municipalities and the urban development sector.

? Ecotourism service providers in Surat will participate in the project?s efforts to stimulate sustainable tourism in the coastal zone.

? Private sector participation in greening of NMT and investing in EV charging infrastructure in Pune City.

? Local private sector actors will be engaged in efforts to design and disseminate business models to finance urban green areas under Output 3.4.

**TABLE 7 : PRIVATE SECTOR ENGAGEMENT BY COMPONENTS**

| Component 1: Evidence-based sustainable and integrated urban planning and policy reform | ? *Consultation with the ICCC for enhancing planning capabilities*<br>? Consultation with private sector for the deployment of Flood Resilience Index<br>? Consultation with the private sector for deployment and systematic scaling of the Flood Citizen Observatory<br>? Consultation with the private sector actors during integrated planning exercises<br>? Consult MSME?s local industry, commerce and citizens throughout the planning and investment cycles to develop the green infrastructure manual<br>? Consultation to private sector actors during integrated planning exercises<br>? Leverage local industry, commerce and citizens throughout the planning and investment cycles to meet green corridor development and climate mitigation priorities |
|---|---|

| | |
|---|---|
| Component 2: Sustainable integrated low emissions, resilient, conservation or land restoration investments | ? _Consult the various industries & MSME?s during the project implementation._<br>? Consult with private sector who are members of Madras Chamber of Commerce (MCCI), Confederation of Indian Industries (CII) to gain knowledge from their prior experience in investments, expertise and localized soil conditions.<br>? Lake Management Committee will consult with the local business communities specifically MSME?s<br>? Specific proposed engagements include:<br>? Direct participation by PPP like M/S Smart Bike for the implementation of the public bicycle share system<br>? Direct participation by PPP for the operations and maintenance of boating in the restored water body<br>? Business models to support nature-based solution implementation.<br>? Leverage corporate social responsibility for investments.<br>? Building on existing engagement with the private sector for financing and best practices.<br>? The types of private sector actors that the project will engage would include the following clusters of industries: technology providers; finance/banking; transportation; industrial and manufacturing; waste.<br>? Specific proposed engagements include:<br>? Direct participation of the private sector through PPPs, in specific investments such as NMT systems, Urban forest plantations; nature-based solutions; EV infrastructure deployment.<br>? Business models to support natural asset management and green corridor elements.<br>? Sustained dialogue with the private sector, while working on green businesses.<br>? Leverage corporate social responsibility for investments.<br>? Building on existing engagement with the private sector. |
| Component 3: Innovative financing and scaling-up | ? _Engage with the private sector for the creation of the Investment Readiness roadmap_<br>? Capture innovative financing solutions in consultation with the private sector.<br>? Capture business models such as revenue-collection or procurement<br>? Use green bonds to mobilize resources from the capital market.<br>? Engage the private sector through land value capture financing schemes<br>? Test innovative financing solutions.<br>? Test business models such as revenue-collection or procurement<br>? Use green bonds to mobilize resources from the capital market.<br>? Engage the private sector through land value capture financing schemes |

| Component 4: Advocacy, Knowledge Exchange, Capacity Building, and Partnerships | ? Engage with the private sector to communicate the benefits to wider stakeholders and communities funded by CSR<br>? Support creation of bankable projects through technical capacity and finance clinics |
|---|---|

**5. Risks to Achieving Project Objectives**

**Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):**

# 1) Risk table

Risk is defined as the effect of uncertainty on project objectives. It is formulated in terms of ?future events?. Risks have been identified during project design through detailed stakeholder consultations and tools such as the UNEP Safeguard Risk Identification Form (SRIF), the gender analysis and the theory of change. A qualitative 1-5 scale has been used to characterise the likelihood (probability of occurrence: 1 = not likely, 5 = expected) and the negative impact on the achievement of project objectives (1 = negligible; 5 = extreme) associated with each risk. In accordance with the combination of likelihood and impact, each risk is assessed as low (green), moderate (yellow), substantial (orange) or high (red) as follows:

**TABLE 8 : RISK CATEGORIZATION**

| | | Likelihood | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| Impact | 5 | yellow | orange | orange | red | red |
| | 4 | green | yellow | orange | orange | red |
| | 3 | green | yellow | yellow | yellow | orange |
| | 2 | green | green | green | yellow | yellow |
| | 1 | green | green | green | green | green |

Climate and COVID risks are identified in the sections following this table.

**TABLE 9: TABLE OF PROJECT'S RISKS**

| Risk description | Category | Risk level/ rating | Risk mitigation strategy | By whom |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Lack of local political support for developing the plans and implementing the pilots reduces project impact | Political | Moderate | Project design involved a detailed process of consultation with local governments, to ensure that project activities respond to their needs and to obtain local political buy-in. Local governments are fully supportive of the proposed project interventions.<br><br>To mitigate this risk during project implementation, the PMU will work closely with the local governments, including by locating a project officer in each city. This person will have the function of maintaining close relationships with the local government and keeping it informed of project progress as well as keeping PMU informed of any possible changes in political priorities. Through this conduit and information, PMU will apply adaptive management to ensure local political support is maintained. Furthermore, PMU will highlight to the cities the international dimension of the project and its potential to raise the international profile of the cities as they cope with their commitments. | Project management unit (PMU), MoHUA and City Authorities |
| Elections trigger leadership changes and projects lose their support | Political | Moderate | Engage with technical & financial levels in the government to allow carry-over of plans between political cycles.<br><br>Put project legal agreements through formal city approval channels. | MoHUA and PMU with City Administrative authorities |

| | | | | |
|---|---|---|---|---|
| Coordination difficulties between entities of the same or different levels of government slows project execution times or reduces impact of project actions | Political | Substantial | This will be important particularly for integrated activities in component 1, 2 and 3, which has a number of planned activities crossing jurisdictional boundaries. To mitigate this risk during project implementation, a number of mitigation measures will be undertaken to promote and facilitate intra- and inter-jurisdictional integration. These include:<br><br>(i) Creation of a Coordination Group (see terms of reference in the section on institutional arrangements)<br><br>(ii) Specific deliverables on undertaking collaborative and participatory processes<br><br>(iii) PSC involves the City Commissioner to help facilitate any such challenges that may be posed.<br><br>(iv) Full time team is based in each city and resources for city works are directly managed by the cities giving ownership. | PSC, CG and PMU |
| Other cities fail to engage in the sustainable cities platform or the federal capacity-building programme, leading to reduced project replication | Political | Low | To mitigate this risk, the PMU will execute a national sustainable cities communication campaign to inform city managers across the country of the project activities and encourage their participation. Furthermore, if needed the MoHUA will undertake consultations with local governments to further encourage their participation through its usual channels. | MoHUA/Project management unit (PMU) |
| Approvals and clearances required for undertaking investments are delayed | Institutional | Medium | The pilots identified are based on the ongoing initiatives and priorities of the city. Thus a clear ownership is demonstrated. The engagement of MoHUA as the lead on execution also supports facilitation of necessary approvals and clearances. | MoHUA and City authorities |

| | | | | |
|---|---|---|---|---|
| City officials are likely to be sensitive with the cost of the project when sustainability parameters are included in the project detailed project report. | Institutional | Medium | Project?s interventions have been identified so that there are no big infrastructure investments critical in the city for the implementation of the project?s actions. This criterion will continue during the detailed design and implementation of project?s actions? | MoHUA and City authorities |
| Competitive priorities of the citizens/City for budget allocation are likely to affect the allocation for Hazard risk financing. | Institutional | High | The project is embedding strategies to associate vulnerable groups (women, informal workers, cooperatives, SMEs?) to the design and implementation of the new urban services since the inception stages of the project.? | MoHUA and City authorities |
| City and State authorities don?t commit to integration of approaches and best practices from project into development policy | Capacity | Substantial | ?      The Coordination group with representatives of key stakeholders will facilitate institutionalization<br><br>?      Engage with other programs of MoUHA like Smart Cities Missions and AMRUT to allow for NBS restoration as part of Livability Standards.<br><br>?      Engage with stakeholders to consistently use the options prepared by the project as the primary option for restoration before exploring other avenues. | City coordination group, MoHUA |
| A national financial or economic crisis affects national, provincial and local budgets (including those of national funds), leading to reduced co-financing, changing priorities and reduced investment | Economic | Moderate | The project has been designed to draw on existing and planned investments and co-financing in each city.<br><br>To mitigate this risk during project implementation, the PMU will regularly monitor the materialization of the expected co-financing, and will develop contingency plans in case of significant deviations. | City Coordination group, Project management unit (PMU), MoHUA |
| Private sector actors fail to engage in project activities, leading to reduced project impact | Economic | Low to Moderate | As described in the previous section, the project has been designed to incorporate the private sector directly in project activities.  To mitigate this risk during project implementation, the PMU will undertake highly participatory processes for project execution, to ensure that private sector needs are taken into consideration. | Project management unit (PMU) |

| | | | | |
|---|---|---|---|---|
| Local civil society stakeholders may not accept the pilots and slow down or stop the implementation | Social | Low | The pilots chosen are based on the city priorities and where necessary engagements have been undertaken to seek public opinion. City process of grievance redressal mechanisms will be used to identify issues and built in solutions | City Coordination Group |
| | | | | |
| Project actions lead to environmental degradation or negative global environmental benefits | Environmental | low | To mitigate this risk during project execution, the PMU will monitor on a periodic basis project progress (maximum every six months) against the UNEP Safeguard Risk Identification Form. On a six-monthly basis it will also assess and identify any further risks in this area, and develop risk mitigation strategies to ensure such degradation or negative benefits do not occur. The UNEP Task Managers will consult with PMU on a six-monthly basis on this matter (through the half-yearly and project implementation review reports). | Project management unit (PMU), UNEP Task Managers |
| Weather events affect the implementation of the pilots, such as extreme rainfall event, or typhoon, or flooding | Environmental | Medium | Integrate in pilot design and plan measures to anticipate and address such situations, considering the specific vulnerabilities of coastal cities. | City Coordination Group/City coordinator |
| Continued Covid Risk may affect the timely execution of the project | Health | Low | The project is expected to start in June 2022, by then one expects most of the citizens to be vaccinated. This will reduce the likelihood of major disruptions in work.<br><br>The PMU will ensure that necessary precautions and measures are followed to protect the personnel engaged with the project work and prepare an contingency plan | PMU |

# 2) Climate risk assessment, climate risks and risk mitigation

*(i) How will the project?s objectives or outputs be affected by climate risks over the period 2020 to 2050, and have the impact of these risks been addressed adequately?*

India faces some of the highest disaster risk levels in the world, ranked 29 out of 191 countries by the 2019 Inform Risk Index. India has very high exposure to flooding, including, riverine, flash, and coastal, as well as high exposure to tropical cyclones and their associated hazards and drought. Disaster risk in India is also driven by its social vulnerability. India?s vulnerability ranking (44 out of 191) is driven by its high levels of socioeconomic deprivation. India scores markedly better in terms of its coping capacity.

1. Hazards

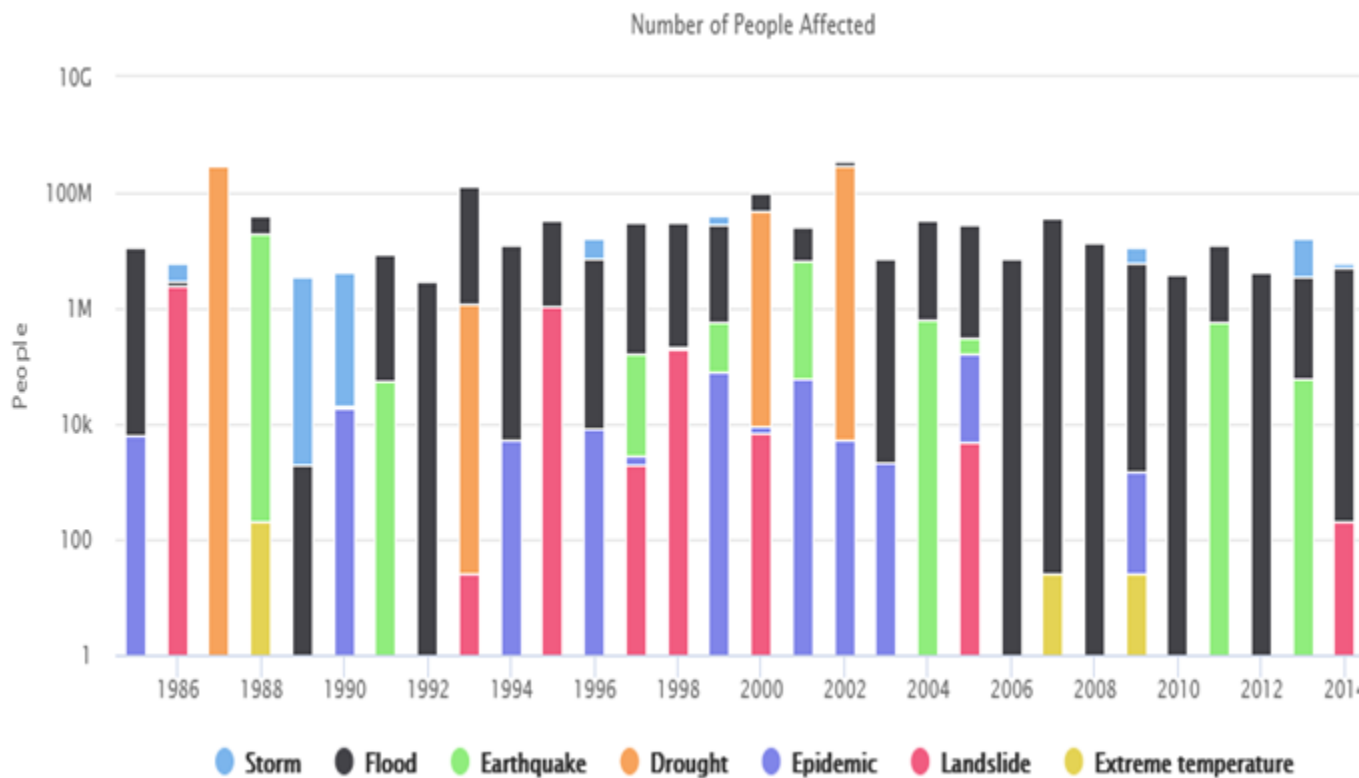The figure below highlights the key hazards faced by the country.



Figure 27: KEY NATIONAL HAZARD STATISTICS FOR INDIA 1985 - 2018

As can be seen from the figure Floods, droughts, and storms and heat waves are the major hazards faced by India.

2. Vulnerability and exposure

Available assessments outline the following projected impacts from climate change by mid-century indicate:

? Increased average annual temperature of 1.5?2.5?C (subtropical) and 1.2?2.2?C (tropical).

? Increased average annual precipitation by 2?17 %; a tendency for increased precipitation during the wet season and decreased precipitation during the dry season.

? Reduced precipitation in some regions; increased dry spells in the east. Increased frequency and intensity of heavy precipitation events.

? Increased duration of heat waves and number of days and nights considered ?hot? (temperatures exceed current climate by 10 %).

? Diminished glacial extent; variable by region.

? Sea level rise of 100?400 mm.

India regularly experiences some of the world?s highest maximum temperatures, with an average monthly maximum of around 30?C and an average May maximum of 36?C. By 2080-2099 the annual median probability of heat wave, currently at 3%, is projected to reach approximately 11%, 13%, or 25% under RCPs 4.5, 6.0, and 8.5 respectively. While heatwaves refer to the periodic occurrence of exceptionally high heats, the incidence of permanent (chronic) heat stress is likely to increase significantly in India under all emissions pathways.

Floods are on average the greatest source of annual losses to disaster in India, costing an estimated $7 billion every year. During the 20th century, flood hazards increased across a majority of India. The implications of the general trend towards more intense extreme precipitation events are serious for potential future flood extent.

Cyclone activity makes a large contribution to disaster risk in India, notably along the east coast. The 1999 cyclone ?Orissa? caused over 10,000 people to lose their lives, and overwhelmed and damaged buildings, lifeline infrastructure, and economic assets along many coastal districts. 86% of all deaths from tropical cyclones are accounted for in India and Bangladesh. Storm drainage infrastructure is vulnerable to being overloaded and cause flooding, which will have adverse impacts on human health and the local economy.

3. Risks

Projections point towards an increase in summer monsoon precipitation, however, snowmelt and glacial melt as a result of climate change will cause changes in the timing of river peak flows (i.e. peaking in early spring and diminishing in the summer) and the year-to-year variability of monsoon rainfall will contribute to a greater frequency of floods and droughts and lower recharge rates of groundwater reservoirs.

Riverine flooding and inland flooding are expected to become more severe in the future with climate change, especially in the Godavari and Mahanadi river basins along the eastern coast of India.

The north western region of India is projected to see an increase in droughts in the future and eastern India is expected to see an increase in the length of dry spells. By 2030, it is estimated that the agricultural losses in India will be over $7 billion and affect 10% of the populations? income, but this estimate could be reduced by 80% if climate resilience and adaptation policies are employed.

Climate change is expected to interact with cyclone hazards in complex ways which are currently poorly understood. Known risks include the action of sea-level rise to enhance the damage caused by cyclone-induced storm surges, and the possibility of increased wind speed and precipitation intensity.

Regarding the pilot cities, risks include the following:

?        Chennai: Chennai has experienced severe impacts from climate change in the past two decades. The intensity and the frequency of these extreme events indicate that climate change is altering Chennai's weather patterns. Between 2004 and 2011, Chennai experienced eight consecutive years of excessive rainfall from the northeast monsoon. For three years since 2011, Chennai experienced drought, with 2013 recording a 33% deficiency of rain, according to data from the India Meteorological Department. Chennai faced one of the largest floods in 2015, which led to damages amounting to US $3-14 billion. The year after the 2015 floods, Chennai saw its worst drought in 140 years. Chennai received 62% less than usual rain during the 2016 northeast monsoon, the city's primary rain season. 2017 and 2018 were also drought years, with water scarcity reaching a peak during the summer of 2019. A Climate Risk and Vulnerability Assessment (CRVA) has been conducted as part of the project preparation and annexed to this document (Roadmap in Portal).

?        Pune: Pune faces most pressing and complex challenges such as uncontrolled growth, continuous inward migration, pressure on urban environment, institutional complexity, etc. The city administration tries to resolve these issues with the use of technology, capital works, internal resources, and the organization?s internal capabilities. Mobility, health of water bodies, access to affordable housing, air pollution, and solid waste management are also some of the critical challenges. In recent years Pune has not been experiencing a trend in rainfall during the last four decades, there has been a marked increase in years with days experiencing heavy rainfall. Such heavy rainfall is more likely to cause flooding. The Mula-Mutha basin and Pune city have witnessed huge transformations in land use over the last three decades. Built-up area has increased from 32% in 1990 to 48% in 2019.The stormwater system in the city has not kept pace with its expansion and encroachment has resulted in the decrease in width of rivers and increase in the number of potential flash flood points in the city.

?        Surat: Surat city historically has been susceptible to flooding. It is estimated that about 90 % of city area is affected by one or other climate hazards ? flooding, coastal storms, cyclones or inundation due to high tides and sea level rise, as most of the city and surrounding areas are less than 10 meters above mean sea level.[1] With increasing sea levels and increased frequency of extreme events, the city is likely to continue experiencing floods in the future. During the last century, there has been an increase of sea level along the Gulf of Cambay by around 0.67 m. if such trends continue, this could have serious implications for the city. Surat city experiences extreme heat events and heat waves due a combination of high temperatures and humidity. Over the last 30 years, the city has experienced a 0.7oC rise in average temperature along with the rise in humidity to 60.4 % from 54.9 %. The primary risks to the project are due to changes in rainfall ? either heavy rainfall or draughts and sea rise change which submerges most of the city, and as well as heatwaves. As per the climate models for 2050/2100, sea rise and precipitation changes have a moderate-high potential to affect the project activities and outcomes. Heavy rainfalls/sea rise change could cause flooding of the city and thereby damaging ecosystems and urban services.

In this context and in that of the project, the primary risks to the project are due to changes in precipitation patterns, generally leading to extremely high rainfall and droughts, as well as heatwaves. In accordance with the assessments reviewed, both have a low-to-moderate potential to affect the project?s objectives and outputs. Heavy rainfalls could cause flooding and, in some participating cities, landslides, damaging ecosystems and urban infrastructure (transport, energy, solid waste management facilities). Increased average temperature and more frequent and longer heatwaves could cause greater fires, leading to damage to infrastructure, increased use of air-conditioning units in cities and users? aversion to walking and cycling, increasing motorized mobility demand. Based on the above analysis, it is deemed that the project has a low risk of being negatively impacted by climate change in the long-term until 2039, and a moderate risk in the longer term.

4. Measures to manage risks

Chennai: Chennai has undertaken a series of efforts to manage climate risks in the Kosathalayar basin. The co-financed loan component (Output 2.1.1) will make a flood adaptation investment for reducing flood risk for 1.9 million citizens (census 2011). The stormwater drainage infrastructure created will reduce flooding risk by implementing an integrated stormwater drainage system. The stormwater drains will be designed to be 1.3 times the current peak design capacity to account for additional surface run-off during higher rains caused due to climate change. The GEF investment will restore the Kadapakkam Lake water using nature-based solutions. The lake will increase the localized capacity of water retention and thus reduce the risk due to water stagnation in the area. The GEF investment will also create additional overflow weirs to account for additional flow both at the inlet and outlet levels to account for higher water flow due to cloud burst events caused due to climate change.

Pune: In 2015 the city disaster management plan had identified the wards that were at risk of floods and flash floods and outlined several mitigation measures. The integrated ICCC platform enables the city to track the changes in temperature, flooding patterns and their impacts so that the city can take early action to mitigate the impact of these adverse events. the project focuses on decreasing its contribution to the crisis by reducing the per capita carbon footprint. This will involve a transformative effort focused on improving the efficiency of use of mobility, focussing on green infrastructure, promoting non motorised transport and increasing the overall green cover across the city. The project on completion would reduce the GHG emissions.

Surat: The potential impact of the climate change and resultant disruptions have partially been addressed through project designs ? Nature based solutions and protection of ecologically sensitive areas that will act as buffer zones/retention areas of flood water. The plans that will be developed in component 1 consider a longer term with appropriate measures and strategies that take into account the potential impact of climate change on the city. The integrated ICCC platform enables the city to track the changes in temperature, flooding patterns and their impacts so that the city can take early action to mitigate the impact of these adverse events.  In line with the hazard risk assessment studies, Dumas Seafront area will be provided with adequate protection through investments in NBS that are part of the pilot project and through adequate regulations.  To address the heat island effect in the city, the project proposes to implement low emissions mobility options through the design of green corridors, NMT and NBS to mitigate heat wave effects and provide conditions for walking, cycling and other NMT modes. Tourism activities/economy are affected by extreme temperatures and the resultant heatwaves. The project plans to integrate the green corridors with

NMT modes within the overall design of the Duma seafront tourism project to provide comforting conditions for cyclists and pedestrians.

(ii) Has the sensitivity to climate change, and its impacts, been assessed?

Chennai: The sensitivity to climate change, its impact has been assessed. Refer to the annexed CRVA document.

Pune: Pune Municipal Corporation as part of Climate Resilience Strategy has focussed on reducing the GHG emissions from Transport, energy sector and have planned and proposed various initiatives to reduce the per capita average per capita annual greenhouse gas emission.

Surat: Yes. As per the regional models, the probability of project getting affected by changes in climate is medium to high in the longer term (2050-2100).

(iii) Have resilience practices and measures to address projected climate risks and impacts been considered? How will these be dealt with?

Chennai: The GEF investment will be used to create a NbS flood resilient infrastructure in lake kadapakkam that will reduce flooding and drought risks that are only exacerbated due to climate change. The nature-based intervention will ensure localised materials are used for the creation of the infrastructure, thereby reducing GHG emissions caused to transporting materials. The project will also increase the storage capacity of the lake thereby reducing flooding risk. The GEF investment will create a Green Infrastructure Manual that would capture the complete process of restoring water bodies and best practices to address climate risks due to flood & drought. The restoration of the water body will also account for additional rainfall events caused by climate change by providing infrastructure like weirs that would help in additional discharge.

Pune: the GEF project would reduce the GHG emissions from traffic and buildings by integrating green building Sustainable Mobility, Non Motorised Transport, Electric Vehicles, Green corridor as part of the Station Area Development Plan under Transit-Oriented Development & Green Infrastructure. This will also help reduce the per capita average greenhouse gas emissions. According to the Pune Municipal Corporation?s Environment Status Report 2018?2019, the per capita carbon footprint of Pune city is 1.6 ton carbon dioxide equivalent, whereas a study conducted by Climate Collective Pune pegs the average per capita carbon footprint of the Pune Metropolitan Region (PMR) at 3.58 ton carbon dioxide equivalent.

Surat: The GEF project a proposed a combination of resilience strategies ? integrated urban planning, low emissions mobility and NBS, that would reduce vulnerability of the coastal areas due to sea rise, reduce dependence on private vehicles through promotion of NMT infrastructure and green corridors and protection of eco sensitive areas such as mangroves. Together, these initiatives and strategies reduce negative externalities and increase the attractiveness of the city for citizens and tourists and create a new and vibrant urban space that provides new business and livelihood opportunities.

(iv) What technical and institutional capacity, and information, will be needed to address climate risks and resilience enhancement measures?

Chennai: The Chennai Resilience Strategy(CRS) prepared by the 100 Resilient Cities network identified a range of action items for addressing climate risks & resilience enhancement. The CRS study identified integrated urban planning as a gap area. The GEF investment will create an integrated urban planning tool. The Flood Resilience Index (GIS tool) and the Flood Citizen Observatory (FCO) will build upon and integrate with the existing Integrated Command and Control Center (ICCC) to enhance the ability of government departments to manage floods risks better. The CRS also identified disaster management training gaps, integrated planning, and knowledge of NbS for lake restorations among the community, vulnerable, and city officials. The GEF investment and the co-financing will help train community members, stakeholders, and engineers in all these gap areas. (outcome 4)

Pune: Pune Resilience Strategy prepared by the Pune Municipal Corporation and the 100 Resilient Cities Network have identified several range of issues and action points by carrying out detailed study. the gaps in the urban infrastructure identified are Rapid urbanization, Mobility, health of water bodies, access to affordable housing, air pollution, solid waste management, flooding/extreme rainfall, and disease outbreak.

The report focuses on creating the Resilient Pune Strategy with 3 pillars, 10 Goals, 28 actions and over 40 projects. The 3 pillars are:

•Growth : Guide integrated & equitable growth in Pune
•Environment: Mainstream climate action, environmental planning & natural resource management in Pune
•Economy: Strengthen the diverse economy & workforce capabilities in Pune

Surat: Under Asian Cities Climate Change Resilience Network (ACCRN) project, Resilience strategy has been prepared for the city. The initiatives included creation of a new institution ? Surat Climate Change Trust (SCCT) which is a partnership amongst the city, business, and community. As part of the resilience strategy, an end-to-end early warning system was developed. The system used complex models to assess the flood risk and helped develop protocols for coordination of multi-agencies in case of water release from Ukai dam. The system now provides 48 hours advance notice in the event of water release from the Ukai dam instead of 6 hours in the past. The city has technical and institutional capacities to undertake complex engineering projects. The project further strengthens these capacities through the development of integrated

approaches that yield better outcomes. The project further provides training activities in the areas such as vulnerability risk assessment and how the flooding and heat waves can be incorporated in the project designs from the inception. The city will benefit from the capacity building and knowledge exchange from the global platform on integrating planning, NBS and low emissions mobility.

3) COVID risk and opportunity analysis

# A. Risk analysis

Covid-19 in India has caused enormous human tragedy ? through the hundreds of thousands of people it killed directly and indirectly, and the suffering caused to millions of others by way of illness and disruption of normal life. The two waves have led to an increase and decrease of cases in a cyclic pattern. presently, after months of a high case, there has been a low plateau with relatively few cases and deaths in the last two months. The first phase had caught India unawares and unprepared to tackle the increase in cases. Lack of healthcare facilities with proposer treatments, shortage of hospital beds, shortage of Oxygen in critical care centres have led to deaths and chaos and fear among the population. The introduction of lockdowns to focus on prevention had crippled the economy and several workers without jobs and money were forces to reverse migrate to their villages. India's vaccine rollout started off slowly, focusing on frontline workers, the elderly, and other high-risk demographic categories. However, rapid acceleration and the seven-day rolling average of daily vaccinations is now inching towards three million, with everyone over 18 years of age now eligible to be vaccinated.

**Assessment for Pune**

Pune is one of the highly populated cities of Maharashtra -- an Indian state which is the most affected by COVID19.The active case load in the limits of the Pune Municipal Corporation (PMC) was very high and continued to increase every week. The Pune City administration also followed the norms and steps taken by both Central and State Governments. The State invoked provisions of Epidemic Diseases Act, 1897 which enabled it to forcibly hospitalized anyone with suspected symptoms. Commercial establishments such as movie halls, malls, swimming pools and gyms were shut across the city as a precaution. Government also issued a ban on all public gatherings and functions. Pune Municipal Corporation decided to close all public gardens and Rajiv Gandhi Zoological Park, effectively to contain the spread of the virus.

The Federation of Trade Association of Pune announced that all shops, barring grocery stores and pharmacies, will be shut in the city, resulting in the closure of up to 40,000 shops. Later some relaxations

were provided by announcing that shops and commercial establishments would be closed on alternate days, in order to implement social distancing and crowd management.

**Assessment for Chennai**

In the wake of Covid-19 and the resultant changes in urban life, during the project design and implementation, it is estimated that mobility and consumption patterns have altered considerably as a result of the pandemic, and will affect the project outcomes, into the near future.

The first case of COVID-19 in India was reported on January 3,2020 in Kerala. Lockdown was announced in Kerala on 23 March, and for the rest of the country on 25 March 2020. In order to contain the virus, spread, restrictions were extended in various states and cities on businesses, movement and included closure of schools, commercial establishments etc. despite these measures, as on 25th June 2021, total cases in India crossed 30 million mark.

In Chennai, the second wave saw a huge spike in cases, with the health infrastructure getting overwhelmed by the first week of May. However, the experience gained from the first wave, along with an efficient pandemic prevention plan put in place by the Greater Chennai Corporation helped bring things under control. The civic body?s learnings from the past year ? surveillance, contact tracing and containment activities ? combined with an integrated pandemic management of organizing fever camps in hotspots, vaccination camps by tying up with residential welfare associations and big companies, and the conversion of care centers to health centers have worked well on the field. the Corporation has been engaging in several containment activities, consisting of both active and passive surveillance, aggressive testing of more than 30,000 swab tests, organising fever camps in hotspots, creating single window systems for lab results, systematic contact tracing, following up of individuals under home isolation and strict enforcement of containment measures in streets registering more than 10 cases. Chennai has so far reported about 5,37,732 cases in the last 18 months.

In Surat, as lockdowns halted economic activity, migrant workers left due to Covid surge and lack of livelihoods. While a detailed account of Covid impact on Surat economy is not available, unemployment has increased.  At least 25 % of workers in the textile industry in Surat have migrated severely affecting production, as per the Federation Gujarat Weavers Association (FOGWA) has said5. In the diamond industry, only 70 % of workers who returned post lockdown have managed a job ? at half their original salary6.

The Covid-19 also has the potential to affect the GEF in the following key activities:

?       Reduced public transport usage: already low share of public transport will be affected as the need for social distancing, reduction of jobs and perceived health risk in public transport will significantly alter the mobility patterns.

?       Covid and use of public spaces: with the Covid restrictions, people started realizing the importance of urban public spaces and the importance of NMT modes as public transport facilities were shut. The use of green corridors for maintaining social distance and the promotion of walking and cycling would need to be included in the project design from the health perspective.

? Waste management: The Covid-19 pandemic has led to substantial increase in biomedical and biohazardous waste. This calls for a change in approach from the cities and cities may want to prioritize the issue of waste management through implementation of new projects.

? City priorities: as the pandemic continues to affect the city, the city government would want to focus on preventing the spread of virus and strengthening of healthcare infrastructure. This may lead to reduced focus on urban sustainability projects and policies.

## B. Mitigation measures

Awareness on social distancing, wearing masks, washing of hands were carried by the Central State and Local Governments. Besides awareness Lockdown measures were adopted providing specific timings to purchase, critical shopping such as medicines, groceries etc, vaccination drive was carried out in stages, encouraging social distancing and crowd management during travel, shopping was encouraged. Testing were carried out to find asymptomatic patients.

Chennai: The GEF intervention and ADB co-financing will adapt to COVID operationally and mitigate by implementing a ?water, sanitation and hygiene? (WASH) program across the Kosathalayar basin. COVID-19 protocols issued by the competent authority like the Ministry of Health and Family Welfare, Government of India and Department of Health, Government of Tamil Nadu will be followed during the design and implementation of the project. Social distancing, Adherence to a safe distance, sanitising at design and project area, wearing masks, Online consultations (where possible) will be some of the safety precautions taken to manage COVID19.

Reduced public transport usage: The pilot projects are expected to be completed by 2025, by which time the entire city would be vaccinated and economy recovers to pre-covid level. This would encourage people to again opt for public transport and NMT. If the pandemic continues to affect urban life, the project team will reconsider the proposed work plan.

Tourism patterns: with focus on nature-based tourism projects integrated with NMT/low emissions mobility options, the project will provide an opportunity for the city to incorporate urban sustainability into tourism projects.

City priorities. The promotion of low emissions mobility/NMT and nature-based solutions are key to mitigate the spread of the virus, given that the social distancing and keeping citizens safe is possible with NMT/low emissions options. The city government remains committed to advance implementation of pilot projects to bring vitality to the city economy.

Therefore, integrating urban sustainability and economic development in pilot projects is key to engage the city authorities.

## C. Opportunity analysis

The state climate action plan creates an overarching umbrella and roadmap for green investment in the state to achieve India?s NDC?s. Additionally, the city of Chennai has also completed the emissions pathways analysis based on future projects and impact of policies on emissions. One of the emissions

assesses the possibility of a low emissions investment pathway that will achieve net neutrality by 2050. The city is currently starting to build a Climate Action Plan that will address the fund flow restructuring required to achieve net neutrality in a post COVID scenario. The city is already implementing many projects to reduce its carbon footprint and investing in low emissions projects activity. The NbS restoration of Kadapakkam lake and the subsequent creation of the green infrastructure manual will institutionalize low emissions alternative adaptation pathways.

Many Indian cities are experiencing improved air quality due to the Covid-19 restrictions. As the GEF project intends to improve air quality through reduction of emissions by promoting clean energy, NMT/low emissions mobility options, there will be significant interest and support from the stakeholders for the project activities. The pandemic also highlighted the importance of urban green spaces. The pilot projects with improved air quality, reduced GHG emissions, improved public open spaces and NMT infrastructure as key dimensions are likely to find support from the city authorities for further scaling of project outcomes.

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[1] G K Bhat, Anup Karanth, Lalit Dashora and Umamaheshwaran Rajasekar (2013), Addressing flooding in the city of Surat beyond its boundaries, Environment and Urbanization published online 23 July 2013.

**6. Institutional Arrangement and Coordination**

**Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.**
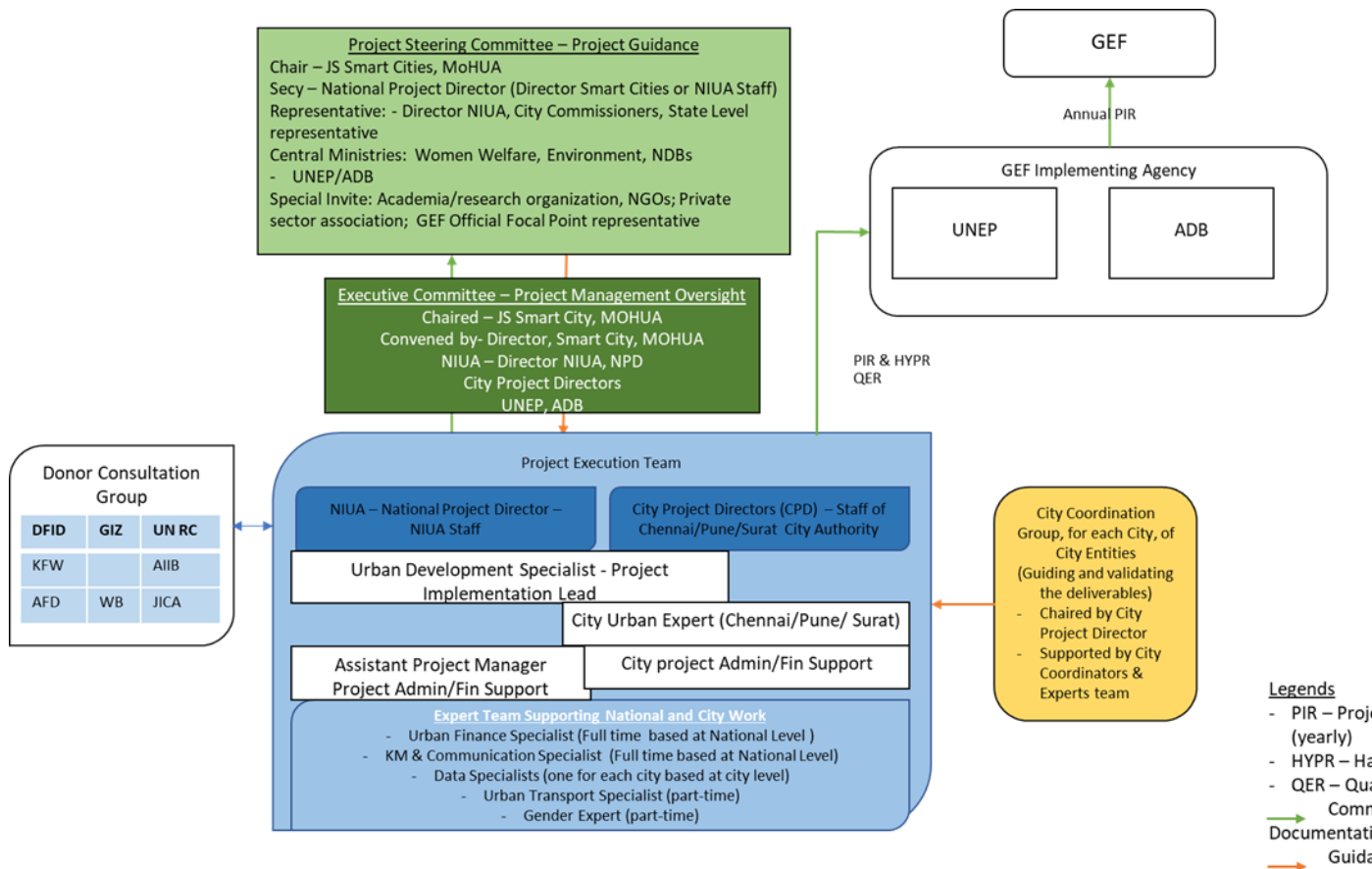
*1.*    Institutional arrangements

Figure 28: PROJECT INSTITUTIONAL ARRANGEMENTS

UNEP and ADB are the GEF Implementing Agencies (IA), with UNEP the lead IA. The Ministry of Housing and Urban Affairs (MoHUA) is the Executing Agency. National Institute of Urban Affairs (NIUA)[1], is the Co-executing Agency. The urban authorities from the three cities ? Chennai, Pune, and Surat ? the Greater Chennai Corporation (GCC), Pune Municipal Corporation (PMC) and Pune Smart City Development Corporation ltd (PSCDC), and Surat Municipal Corporation (SMC), respectively will take the lead in implementing the activities in the three target cities. Annex K provides further details on the roles and responsibilities of the implementing and executing agencies.

Project Execution oversight and guidance: A Project Executive Committee (PEC) headed by the JS, Smart Cities MoHUA will be established to ensure coordination at the national and city level as well as act as decision making body for project related activities. The primary role of the PEC will be to ensure effective implementation of project activities and to approve project workplans, budget re-allocations (if needed), and other related actions to improve the project effectiveness and timely implementation. PEC will be convened regularly by the Director, Smart Cities, MoHUA. The PEC will include the National Project Director (NPD), City Project Directors (CPDs), and representatives of the UNEP and ADB. The Project Implementation Lead (PIL) and CPCs will prepare the agenda for the meetings and present the necessary information at the meeting the PEC to take decisions.

Project Execution Team: Director, NIUA or a person (full time Staff of NIUA), designated by the Director, will guide, and supervise the implementation of the project as the NPD. At the city level, the concerned city authorities of the three target cities will, appoint a CPD. NPD and CPDs will provide the overall supervision and ensure timely implementation of the project activities. NPD will facilitate the implementation of activities under component 4 and also facilitate interaction with other cities and states for the outreach and capacity building of the activities. NPD with his technical expertise in Urban Development will also substantively guide the Project Implementation Team (PIT). CPDs will facilitate the support of city and state level government departments and supervise the city level project activities.

The Project Implementation Team (PIT), funded by the project, will support the NPD and CPDs and be responsible for the day-to-day activities of the project implementation. The PIT will be headed by a full time Urban Development Specialist who will act as the Project Implementation Lead (PIL) and report to the NPD. City Project Coordinators (CPC) stationed in the target cities and working under the guidance of the CPDs, will support the PIL in implementation of the city level activities. The PIL with the support of the CPCs, will be responsible for the day-to-day management and operation of the project. S/he will ensure that the project is implemented as per the CEO endorsement document approved by GEF. S/he will be responsible for developing annual work plans, monitoring the implementation of the work plans, development of TORs for procurement with support from the PET, and undertaking any trouble shooting. S/he will regularly update the NPD and CPDs, with the support of CPCs, and seek NPD and CPDs? advice on project matters. PIL, with inputs from CPCs, will also be responsible for timely reporting to the UNEP, calling the PSC meetings and meeting of the donor consultation group, S/he will be supported by the PMT in undertaking these tasks.

PIL and CPCs will be supported by a project management team (PMT) consisting of Assistant Project Manager, Project Administrative Assistant, and Project Finance Assistant at the national level. PMT will also include a project/finance administrative assistant to support CPCs in management of project will also be stationed at the city level. The project management team will support the PIL and CPCs in the administrative work of the project, including organization of the meetings, undertaking procurement, preparing, and finalizing project reports, ensuring timely delivery of reports and consultancy reports, etc. The PIL will lead the substantive work of the project implementation ? preparing of work plans, advising and supervising the quality of project deliverables, etc. In this PIL and CPCs will be supported by a team of Project Experts (PET), full time experts ( Urban Finance Specialist, and Knowledge Management and Communication Specialist) plus part time experts hired as per the project needs (Gender Expert, Data Management Specialist, Urban transport expert, etc.). Data specialists will be hired for each of the cities and be stationed in city as part of PET.

Arrangements for ADB component: Chennai will appoint a similar Project Implementation Team including a management team and team of experts, and the City Project Manager/Coordinator will work in close cooperation with the PIL. CPM/C will provide all the required information in preparing the annual work plans for Chennai as well as progress reporting on a semi-annual basis. All the project activities for Chennai across the four components will be funded through the ADB component of the project and implemented by the City team in close coordination with the PIL.

Project Steering Committee: A Project Steering Committee (PSC) will be established ? Chaired by MoHUA (JS Smart Cities). The Director NIUA (if the Director is not the NPD), representatives of different

ministries including women welfare, finance and other relevant ministries, will be the members of the PSC. The Administrative heads of the City Authority will also be the members of the PSC. NPD will act as the secretary of the PSC. PSC will invite representation from the non-government actors ? civil society, academia/research entities, private sector, etc. UNEP, ADB and GEF Official Focal Point of India will also be invited as Observers. The PSC will be conducted once in 6 months. The PSC will have two parts ? an advisory meeting where all the members, special invites and observers participate; and, an executive meeting to discuss operational matters which will be limited to the members and UNEP/ADB representatives.

City Coordination Group: At each of three targeted cities, a city level Coordination Group (CG) will be established. This group will be actively engaged in the development of materials and finalization of the outputs at the city level. The group will consist of relevant city and state entities that have a mandate for urban development in the city jurisdictional area. The purpose of the group is to foster coordination among various entities whose support will be required and also act as an informal mechanism to promote coordinated integrated planning. The City Coordinator will help organize the meeting of this group as required. The members of this group will provide advice, review the outputs, advise on uptake of city and state level outputs into city and state development and investment decision making processes.

Donor Consultation Group: A donor consultation group will be constituted to meet in parallel to the PSC. The group will be chaired by NPD and the primary objective is to exchange information on the different initiatives being implemented by the donors to enable better synergies. UN Resident Coordinator (UN RC) will be a member of the Donor Consultation group. UN RC may appoint the focal point of climate change thematic area in the UN Climate Team as the representative to the group. This will be the primary channel of sharing information with the UN agencies on the project activities and identifying any potential synergies.

Fund Management: The GEF funds for implementing the project will be channeled through UNEP and ADB. The GEF funds through UNEP will support the implementation of project activities at National level and in the two cities ? Pune and Surat. The GEF funds channeled through ADB will primarily support the project activities in Chennai. UNEP will enter into agreement with NIUA for the implementation of national level and city level project components in Pune and Surat. NIUA will directly manage the national level component. Pune and Surat City Authorities, in consultation with the MoHUA and NIUA, will identify the most suitable arrangement for management of funds for the implementation of the city level project activities. The arrangement may include an appropriate national not-for-profit entity with requisite expertise and capacity to manage funds and provide technical expertise to implement the city level project activities. ADB will enter into agreement with GCC to provide the GEF funds for implementing project activities in Chennai and some national level activities. UNEP will sign a Project Cooperation Agreement (PCA) with NIUA, after the execution arrangements between the NIUA and the cities have been agreed by all the parties.

# 1) Coordination with other initiatives

GEF 6 - Sustainable Cities, Integrated Approach Pilot in India (GEF6-IAP Program) ? The project will coordinate closely with the GEF 6 project and built upon the work undertaken by the project. The project will specifically build upon the following deliverables developed as part of the project:

(a)   Guidance and methodology for sustainability plan development.

(b)   Risk and Vulnerability maps and management plans to draw lessons for work specifically in Chennai and Surat.

(c)   Share the investment plans developed for reducing GHG emissions through component 4 activities.

(d)   Link  the project KM platform with the project KM platform.

At the onset of the project implementation a meeting will be organized with the GEF6-IAP Program team to identify the deliverables that could be used as part of the project and built upon. The Team will also be invited as part of the Donor Coordination team for regular information sharing and identifying work of the programme that could be leveraged for SCIP India project.

<u>Chennai</u>

Adyar and Cooum Basin. In Phase I, covering Zones 7, 11 & 12 in the Adyar and Cooum basin, the construction of integrated storm water drain (ISWD) and improvements to canals have been taken up under Tamil Nadu Sustainable Urban Development Project that was funded by the World Bank. This project involved construction storm water drains for the length of 406 km at an estimated amount of US$ 168 million. The project directly benefited about 2.4 million citizens who live within the 2 km buffer area of these rivers. All works have been completed.

Kovalum Basin. ISWD project for Kovalam  is taken up by funding from the German Development Bank (KfW) at the cost of US$ 165 million to a length of 360 km. This project directly will benefit about 1.8 million citizens who live in this sub-basin of Chennai. The project is expected to commence implementation in 2021.

Kosasthalaiyar River Basin is located in the northern part of Chennai, consisting of 127.80 sq. km covering GCC administrative zones 1, 2, 3, 7 & 8. The project area has eleven (11) sub-watersheds based on the topography and natural flow patterns. The total length of the existing stormwater drain is 280km, of which 110 km length of the drain is in good condition, which will be retained. The remaining 170km of the drain is required to be rehabilitated due to inadequate hydraulic carrying capacity. Apart from the existing drain (280 km), a new drain for 588 km has been proposed. Necessary interlinking of water bodies through the existing or proposed drain has also been considered to maintain the water balance and achieve maximum water storage within the Kosasthalaiyar drainage basin. This project, funded jointly by ADB and GCC is scheduled for implementation in 2021. The total project investment is about US $ 472 million (ADB component about US $ 251 million) and is expected to directly reduce the flooding impact for 1.9 million citizens.

Investments in canal restoration: The rehabilitation works of 7 macro drains/surplus canals managed by the state Public Works Department (PWD) are also being considered part of an Integrated Urban Flood Management approach. In parallel to the ADB loan project, adopting the same flow model and designs, the PWD will implement the restoration of three macro drains/surplus canals in the basin, namely Retteri Surplus (2.01km), Puzhal Surplus (12.23km), and Thanikachalam Drain (3.62km).  Under the project,

GCC will implement rehabilitation of the remaining four macro drains/surplus canals (Ambattur Surplus, Korattur Surplus, Kadapakkam surplus, and Ariyalur Surplus) with ADB funding. The eastern portion of the north Buckingham-Canal watershed is lower than the canal bed level. Hence an existing pumping station equipped with two 10 HP pumps having a capacity of 2833 LPM each and 3 m diameter sump was constructed by GCC near Kargil Nagar to pump the rainwater into Buckingham Canal during floods or on an as-required basis. An additional pumping station comprising three higher capacity pumps is proposed in Kargil Nagar due to the lower capacity and ageing pumps. A new stormwater pumping station has been proposed at Ernavoor to avoid flood inundation based on the detailed analysis. All of these canal improvements will be part of the Kosathalayar basin restoration project that will be funded jointly by ADB, GCC with support from PWD. These improvements will create additional ability to handle peak rainfall caused and exasperated by climate change by providing higher pumping capacity.

Investments in lake restoration: Greater Chennai Corporation has taken up restoration of water bodies using a range of programs and collaborations. GCC identified 210 water bodies to be restored and rejuvenated; out of the 210 water bodies, restoration of 9 water bodies has been completed under annual budget, discretionary member of legislative assembly fund (MLA fund).  Restoration of 63 water bodies are taken up under smart city funds, and rejuvenation of 64 water bodies are taken up under Corporate Social Responsibility (CSR) fund. Restoration of 49 ponds at the cost of US $ 24 million will additionally be taken up under the Chennai Mega City Development Mission (CMCDM) fund that was specifically created for assisting in urban infrastructure and basic services projects by the Government of Tamil Nadu.

The Greater Chennai Corporation also engages with the private sector through the Corporate Social Responsibility (CSR) Scheme to restore selected water bodies. The GCC along with Chennai Smart City Limited (CSCL) has instituted the ?Chennai Water Restoration Framework?. This framework allows for distinct roles for the various stakeholders and outlines the roles and responsibilities for the related stakeholders (like owner, technical restorer, funder, operations & maintenance, public oversight). The framework allows for funding of water bodies to be taken up by private individuals and institutions. Many water bodies in Chennai have been taken up for restoration under this scheme. Companies and business associations including the Confederation of Indian Industries (CII), Cognizant Technology Solutions, Wipro etc. have funded the restoration of many water bodies in the city.


[1] NIUA is an autonomous institute under MoHUA established in 1970 to bridge the gap between research and practice on issues related to urbanization, and suggest ways and mechanisms to address urban challenges in the country.

**7. Consistency with National Priorities**

Describe the consistency of the project with national strategies and plans or reports and assesments under relevant conventions from below:

NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

The project is consistent with the following national strategies and plans or reports and assessments under relevant conventions:

National Smart Cities Mission is an urban renewal and retrofitting program by the Government of India with the mission to develop smart cities across the country, making them citizen-friendly and sustainable. The Union Ministry of Urban Development is responsible for implementing the mission in collaboration with the state governments of the respective cities. Tamil Nadu has 12 smart cities including Chennai. The Chennai Smart City Limited (CSCL) has restored nearly 43 water bodies across the city. CSCL also has implemented projects on many thematic areas like transport, NMT, energy, technology etc. Surat Smart City Development Limited (SSCDL) has implemented projects in the area such as Water Supply Management, Quality & Water Recharging, recycle and reuse of sewage, renewal energy to meet 10 % of the city requirement, transport infrastructure, NMT infrastructure etc. Pune Smart City Development Corporation Limited (PSCDCL) Special Purpose Vehicle (SPV) for the implementation of the Smart City projects, is implementing Smart Street Lighting, transport projects such as e-buses, asset management system for road network, project to enhance Livability such as increasing open spaces from 4% to 10% of total area through 13 parks and 3.4 km world-class riverfront development etc.

Atal Mission for Rejuvenation and Urban Transformation (AMRUT) was launched in June 2015 with the focus to establish infrastructure that could ensure adequate robust sewage networks and water supply for urban transformation by implementing urban revival projects. The purpose of Atal Mission for Rejuvenation and Urban Transformation (AMRUT) is to (i) ensure that every household has access to a tap with assured supply of water and a sewerage connection; (ii) increase the amenity value of cities by developing greenery and well maintained open spaces (e.g. parks); and (iii) reduce pollution by switching to public transport or constructing facilities for non-motorized transport (e.g.walking and cycling). Some of the broad targets of AMRUT scheme are ascertaining that everyone has access to tap water and sewerage facilities, greenery like parks and open spaces are well maintained, digital and smart facilities like weather prediction, internet and WiFi facilities, pollution reduction by encouraging the public for using cheaper but secure public transport etc. 2 lakes in Chennai have been taken up for restoration under the AMRUT scheme. In Surat, development and augmentation of the sewage treatment plants have been taken up under AMRUT. Surat city undertook water supply project to meet the demand in the city.

National Plan for Conservation of Aquatic Eco-systems (NPCA): The government has merged the National Wetlands Conservation Programme (NWCP) and the National Lake Conservation Plan (NLCP) into an integrated scheme of National Plan for Conservation of Aquatic Ecosystems (NPCA)

National Lake Conservation Plan. The Ministry of Environment and Forests (MoEF) formulated the National Lake Conservation Plan (NLCP) in 2001 for conservation and management of polluted and degraded lakes in urban and semi-urban areas. The major objectives of NLCP include encouraging and assisting state Governments for sustainable management and conservation of lakes. Lakes being major sources of accessible fresh water, require well planned, sustainable and scientific efforts to prevent their degradation and ultimate death.

National Wetland Conservation Programme: This programme is being implemented by the Union Ministry of Environment and Forests (MoEF) and is formulated for the restoration & protection of wetlands in India.

Vision 2023: The Vision 2023 program of the Government of Tamilnadu plans to implement a structured programme to identify and restore water bodies in the city. The program had an initial draft outlay of Rs 500 Cr but other sources planned for the mission are via grants from GoTN / GoI and Loans. The project envisages PPP, models to augment financing needs.

?     <u>Nationally Determined Contributions (NDC)</u>: The project supports the implementation of India?s NDC by directly support 3 initiatives specifically highlighted in the India?s FIRST NDC to achieve the targets. These are viz. Smart City Mission, AMRUT, and FAME (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles. Project supports protection of sensitive natural environment, increasing green spaces, and flood management to increase resilience and reduce GHG emissions, which are part of, both, the Smart City Mission and AMRUT initiatives. The project supports implementation of FAM through creation of EV infrastructure plan as well as NMT plan and policy to strengthen the sustainable and green transport effort.

?     <u>United Nations Sustainable Development Framework, India 2018-2022</u>: This project is aligned with priority IV of the UNSDF ?Climate Change, Clean Energy, and Disaster Resilience?. The goal of priority is to ensure by 2022, environmental and natural resource management (NRM) is strengthened and commitments have increased on clean energy and more resilient to climate change and disaster risks. Coordination with the UN Country Team, including the Resident Coordinator, on UNDAF and this project will be undertaken with the support of UNEP?s India Office.

?     <u>Sustainable Development Goals (SDGs)</u>. The project is also fully in line with national level efforts towards the implementation of SDGs, particularly SDG5 (Gender Equality) , SDG 11 (Sustainable Cities and Communities), SDG 13(Climate Action) , SDG 14 (conserve and suitably use the oceans seas and marines resources for sustainable development) and SDG 15 (Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss).

?     The World Lake Vision has been developed by International Lake Environment Committee (ILEC), Japan, in collaboration with UNEP, aiming at illuminating the growing crisis in management of lake ecosystem, articulating principles to guide the transition towards managing lakes for their sustainable use and to provide a practical blueprint for ensuring long-term health of lakes and integrity of their survival and economic development. The World Lake Vision has articulated the basic action plan for sustainable use of lakes and wetland resources in the form of seven basic principles, which, if implemented in letter and spirit, will have the potential of transforming a water stressed society to an enlightened society that sustains itself without degrading its natural foundation.

**8. Knowledge Management**

**Elaborate the "Knowledge Management Approach" for the project, including a budget, key deliverables and a timeline, and explain how it will contribute to the project's overall impact.**

Knowledge management is a central component of this GEF project, and core to achieving the transition envisaged in the project?s theory of change. A key focus in this sense is on strengthening the capacities of public administrations through the provision of learning material and training of key stakeholders

(particularly local government officials) focused on integrated strategic planning and sound implementation of innovative investments better aligned with urban sustainability principles. Furthermore, knowledge management is essential to support the dissemination of evidence on the performance of integrated and other innovative approaches and to facilitate access to viable business and models and financial solutions for the implementation of innovative approaches to sustainable urban development. The end goal of dissemination, of course, is replication and expanded uptake both by the five target urban areas and by additional cities beyond those directly targeted by the project.

With these goals in mind, the project will develop and curate knowledge on integrated planning and sustainable solutions for urban transformation. The project envisages maintaining continuous dialogue and connection with the SCIP global platform, with the participating cities and with the national government, and knowledge management will be at the core of this strategy. The knowledge management strategy will be anchored around the following activities:

1. <u>Compiling of knowledge on integrated planning and sustainable urban solutions</u>. The project will compile experiences, good practices and lessons learned in undertaking integrated planning and investing in sustainable solutions, based on the experiences in India and other Country projects of UrbanShift. It will identify, organize and document solutions for cities with a focus on low emissions development pathways, biodiversity conservation and sustainable land management in urban areas. Knowledge compilation at the child project level will connect with experiences, good practices and lessons learned shared through the UrbanShift. It will benefit from the Global Platform?s contributions on international best practices and methodologies, which the project will further make available and disseminate in India. At the national level, the project?s knowledge compilation effort will focus on adapting to India?s context,  information on experiences and good practices.

2. <u>Compiling of project experiences, good practices and lessons learned</u>. Through its knowledge management activities, the project will compile experiences, good practices and lessons learned, based on the results achieved in components 1, 2, 3, as documented in the various project reports and deliverables. These will be shared with other cities through the national cities platform (output 4.1) and the NULP. In this way, the project creates a circular dynamic in which learning, innovation and documentation are extended to other cities. This information will also be shared with cities by making this available through UrbanShift platform. Compilation will be undertaken through multiple ways, including:

    1. Through the annual monitoring report envisaged for all the integrated plans developed for the participating cities, the project will provide useful factual evidence and lessons learned on the implementation of integrated strategic projects (component 1).
    2. Through the periodic monitoring reporting envisaged in the integrated low-emission resilient plans in the participating cities, the project will provide useful factual evidence and lessons learned on the implementation of such plans for other cities (component 2).
    3. Through the monitoring reports of the project?s demonstrations, including good practices, lessons learned and professional and stakeholders? experiences (component 2).
    4. Through the assessment of financial instruments to support sustainable urban development, highlighting good practices and lessons learned (component 3).

3. Transferring compiled knowledge to local stakeholders through training materials and capacity-building activities (materials will be used in face-to-face training and compiled on the national platform). Knowledge compiled through 1, 2 and 3 above will be transferred to such stakeholders through capacity building activities at the city level and at National (output 4.2) and SCIP capacity building activities undertaken at the national level. This includes (see also output 4.2 for further information):

    1. City level capacity-building ? Under each of the components 1,2, and 3 city stakeholders will be provided capacity building on the work undertaken in these components.
    2. Training of other cities in States of participating cities: Under component 4.2 participating cities will conduct training of government stakeholders from cities.
    3. Training of trainers: TOT will be carried out for the staff of State Urban development institutes which are responsible for training of government planners.
    4. With the support of the Global Program, the Federal capacity-building program will organize at least two National Dialogues (national events including Ministries and local authorities; one at the beginning of the project and one at the end), as well as in the middle of the project with methodology and experts provided by the Global Program.
    5. With the support of the Global Program, the Federal capacity-building program will organize a SCIP Lab: Hands-on, problem solving, case-study based opportunity offered to one city, to be chosen during project implementation.
    6. Participant cities will also participate in the UrbanShift events: a regional forum offering city academies (training), peer-to-peer exchanges (networking) and high-level ministerial events.

4. Storing and transferring compiled knowledge through a national online platform (sustainable cities platform). Managed by NIUA, the website will serve as a repository of all knowledge materials produced by the project, while facilitating access to project?s participants and providing an entry point to the global program. It will include a library of best practices, solutions and tools on key topics related to sustainable cities, which provides access to information compiled under 1 and 2 above. It will also provide information on capacity building opportunities and store training materials. The web platform will expand the project?s outreach potential, while providing the flexibility needed to create a living space, updated with new tools and research, as the project evolves, and a place to accumulate the project's institutional knowledge. It will connect to the SCIP global program web platform to provide access to information garnered at the international level and produced by national platforms developed in other participating child countries. The platform will include modules on:

    1. Integrated urban planning
    2. Urban finance
    3. Local government forum
    4. Capacity building

Target audience

The knowledge and capacity building component of the project focuses on seven priority groups, each with specific needs. Accordingly, the project will approach each group in different ways, with pedagogically

appropriate materials for the intended outcome, either advocacy, capacity building or higher-level broader policy discussions. The main groups identified are:

o Urban practitioners;

o Local government officials;

o National-level policy advisors;

o Urban experts and researchers;

o Financiers of urban investments;

o Private sector investing in urban development;

o Non-governmental organizations, including those involved in nature conservation efforts;

o Urban and conservation civil society.

Timeline

Knowledge management activities will start in month 6, by establishing the protocols for regular information collection. The project work plan provides timeline details for each specific activity.

Gender-sensitivity

Effort will be made to ensure that the production of all knowledge management materials is undertaken in a gender-sensitive way, and that the produced materials are gender-sensitive. This will include, where possible:

(i)        Selecting male and female content-producers and reviewers for diversity of perspective;

(ii)       Using gender-sensitive language and gender-balanced images (women not presented as victims but as agents of change)

(iii)      Checking context and content (use gender analysis; use convincing gender arguments based on reliable sources and qualitative and quantitative data including sex disaggregated data)

(iv)      Making reference to international and national policy framework, policies, strategies and plans related to gender.

Budget

| *Knowledge products and Capacity Building* | |
|---|---|
| | |

|  | Cost Estimates (?000 USD) |
|---|---|
| *Knowledge Products* | |
| *Green Infrastructure Manual* | *207.20* |
| *Planning Guideline for TOD Station Area* | *95.00* |
| *EV Ready Guidelines* | *75.00* |
| *Guidelines for deliverable integrated plans for resilient coastal zone development using NbS and low emission mobility* | *50.00* |
| *Feasibility assessment of business models to establish green corridors and PPP initiatives* | *160.00* |
| *Design of innovative financing mechanism for green corridors and identification and due diligence of replication* | *20.00* |
| *PPP funding model, including pre-feasibility assessment, for NMT infrastructure creation and PBS in Dumas Pilot Project Area (Training module will be included as part of the deliverable using 10% of funds)* | *40.00* |
| *Coordinated and cooperative investment planning mechanism for NBS among various departments to pool investment budgets established* | *40.00* |
| *Establishing National Project Website* | *100.00* |
| *National Cities communication campaign* | *25.00* |
| *Workshops* | |
| *5 Workshops related to Green Infrastructure Manual* | *10.00* |
| *City Capacity Building workshops (Pune and Surat)* | *210.00* |
| *Participation in SCIP Labs* | *0.00* |
| *Training of Trainer workshops (Del 4.1.4)* | *70.00* |
| *National Dialogues (Pune and Surat)* | *75.00* |
| *State level training workshops (Pune and Surat)* | *70.00* |

| | |
|---|---|
| *Community & National Webinars for Capacity Building & Knowledge Sharing* | *17.55* |
| *Inception and Project ending workshop* | *30.00* |
| | *1,294.75* |

**9. Monitoring and Evaluation**

**Describe the budgeted M and E plan**

Monitoring and Evaluation (M&E) activities and related costs are presented in the cost M&E plan (Annex J) and are fully integrated in the overall project budget. The project will comply with UNEP standard monitoring, reporting and evaluation procedures. Reporting requirements and templates are an integral part of the legal instrument to be signed by the Executing Agency and the Implementing Agency. The project will have a project-funded full time Monitoring and Evaluation Specialist to support project M&E activities (see the terms of reference for information on that person?s role).

The project M&E plan is consistent with the GEF Monitoring and Evaluation policy. The Project Results Framework presented in Annex A includes SMART indicators for each expected outcome as well as end-of-project targets. These indicators along with the key deliverables and benchmarks included in Annex L will be the main tools for assessing project implementation progress and whether project results are being achieved. The means of verification to track the indicators are summarized in Annex A.

The M&E plan will be reviewed and revised as necessary throughout the project to ensure project stakeholders understand their roles and responsibilities vis-?-vis project monitoring and evaluation. Indicators and their means of verification may also be fine-tuned at the inception workshop. General project monitoring is the responsibility of the Project Management Unit (PMU) but other project partners could have responsibilities in collecting specific information to track the indicators. It is the responsibility of the Chief Project Coordinator to inform UNEP of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely fashion.

The executing agency will receive periodic reports on progress and will make recommendations to UNEP concerning the need to revise any aspects of the Results Framework or the M&E Plan. Project oversight to ensure that the project meets UNEP and GEF policies and procedures is the responsibility of the project?s UNEP Task Managers. The UNEP Task Managers will also review the quality of draft project outputs, provide feedback to the project partners, and establish peer review procedures to ensure adequate quality of scientific and technical outputs and publications.

Project supervision will take an adaptive management approach. The UNEP Task Managers will develop a project Supervision Plan at the inception of the project, which will be communicated to the Project Management Unit and the project partners during the Inception Workshop. The emphasis of the Task Manager?s supervision will be on outcome monitoring but without neglecting project financial management and implementation monitoring.

Progress vis-?-vis delivering the agreed project global environmental benefits will be assessed with the executing agency at agreed intervals. Project risks and assumptions will be regularly monitored both by the PMU, the project partners and UNEP. Risk assessment and rating is an integral part of the PIR. The PIR will be completed by the Chief Project Coordinator and ratings will be provided by UNEP?s Task Managers. The quality of project monitoring and evaluation will also be reviewed and rated as part of the PIR. UNEP?s Task Managers will have the responsibility of verifying the PIR and submitting it to the GEF. Key financial parameters will be monitored quarterly to ensure cost-effective use of financial resources.

Since this is a Full-Size Project (FSP), resources have been set aside in the project budget for a Mid-Term Review (MTR) or Mid-Term Evaluation (MTE). The Task Managers will decide when the MTR/MTE shall be initiated. The purpose of the Mid-Term Review (MTR) or Mid-Term Evaluation (MTE) is to provide an independent assessment of project performance at mid-term, to analyse whether the project is on track, what problems and challenges the project is encountering, and which corrective actions are required so that the project can achieve its intended outcomes by project completion in the most efficient and sustainable way. The review will include all parameters recommended by the GEF Evaluation Office for Terminal Evaluations and will verify information gathered through the GEF tracking tools, as relevant. The review will be carried out using a participatory approach whereby parties that may benefit or be affected by the project will be consulted. Such parties were identified during the stakeholder analysis (see section 2. above). Members of the PMU may be interviewed as part of the MTR/MTE process and the PMU will develop a management response to the evaluation recommendations along with an implementation plan. It is the responsibility of the Task Managers to monitor whether the agreed recommendations are being implemented.

In-line with the UNEP?s and ADB?s evaluation policy and the GEF Evaluation requirements, the project will be subject to a Terminal Evaluation. Additionally, a performance assessment will be conducted at the project?s mid-point.

The Terminal Evaluation will be managed jointly by UNEP and ADB Evaluation Offices. The Evaluation Office to lead the Terminal Evaluation (TE) will liaise with the other Evaluation Office throughout the process. Key decision points in the evaluation process will be made jointly by both Evaluation Offices in a collaborative manner [finalisation of Evaluation ToRs, selection of evaluation consultants, review of draft report and acceptance of final report].

The TE will provide an independent assessment of project performance (in terms of relevance, effectiveness and efficiency), and determine the likelihood of impact and sustainability. It will have two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among UNEP, ADB, GEF, executing partners and other stakeholders. The direct costs of the evaluation will be charged against the project evaluation budget. The UNEP Task Manager will inform the UNEP Evaluation Office of the approaching Terminal Evaluation one year before the operational completion of the project.

The TE report will be sent to project stakeholders for comment. Formal comments on the report will be shared by the Evaluation Offices in an open and transparent manner. The project performance will be assessed against standard evaluation criteria using a six-point rating scheme. The final determination of

project ratings will be made by the Evaluation Offices of UNEP and ADB when the report is finalised. The evaluation report will be publicly disclosed and will be followed by a recommendation compliance process.

The evaluation recommendations will be entered into a Recommendations Implementation Plan template by the Evaluation Office. Formal submission of the completed Recommendations Implementation Plan by the Chief Project Coordinator is required within one month of its delivery to the project team. The Evaluation Office will monitor compliance with this plan every six months for a total period of 12 months from the finalization of the Recommendations Implementation Plan.

The GEF Core Indicator Worksheet is attached as Annex F. It will be updated at mid-term and at the end of the project and will be made available to the GEF Secretariat along with the project PIR report. As mentioned above, the terminal evaluation will verify the information of the tracking tool.

The project will comply with ADB policy & practice for M&E. ADB will support M&E for the Chennai and Madurai intervention, using a common methodology and in close coordination with the UNEP-led national M&E activities.  The GEF MTR and TE will be supplemented by a project completion report for the ADB baseline loan undertaken by the Internal Evaluation Department (IED).

The GEF contribution for this project?s M&E activities is US $160,000 (See Annex J of the CEO ? ER document attached to the GEF Portal). Table below gives the summary of M&E activities.

| M&E Activity | Description | Responsible Parties | Timeframe | Indicative budget (USD) |
|---|---|---|---|---|

| Inception Workshop (IW) | Report prepared following the IW; which includes:<br><br>- A detailed workplan and budget for the first year of project implementation,<br><br>- An overview of the workplan for subsequent years, divided per component, output and activities.<br><br>- A detailed description of the roles and responsibilities of all project partners<br><br>- A detailed description of the PMU and project steering committee (PSC), including an organization chart<br><br>- Updated Procurement Plan and a M&E Plan, Gender Action Plan<br><br>- Minutes of the Inception Workshop | Execution: PIL<br><br>Support: PMU | 1 report to be prepared following the IW, to be shared with participants 4 weeks after the IW (latest) | Budget: 20,000 |
|---|---|---|---|---|
| Steering Committee Meeting | Prepare minutes for every Steering Committee Meeting. | Execution: PIL<br><br>Support: PMU | At least 2 per year.<br><br>Minutes to be submitted 1 week following each PSC meeting | As part of CPC and PMU budget |

| Half-yearly progress report | Part of UNEP requirements for project monitoring.<br><br>- Narrative of the activities undertaken during the considered semester<br><br>- Analyses project implementation progress over the reporting period;<br><br>- Describes constraints experienced in the progress towards results and the reasons. | Execution: PIL,<br><br>Support: PMU | Two (2) half-yearly progress reports for any given year, submitted by July 31 and January 31 (latest) | As part of CPC and PMU budget |
|---|---|---|---|---|
| Quarterly expenditure reports | Detailed expenditure reports (in excel) broken down per project component and budget line, with explanations and justification of any change | Execution: PIL and Financial Officer<br><br>Support: PMU | Four (4) quarterly expenditure reports for any given year, submitted by January 20, April 20, July 20 and October 20 (latest) | As part of CPC and PMU budget |

| Project Implementation Review (PIR) | Analyses project performance over the reporting period. Describes constraints experienced in the progress towards results and the reasons. Draws lessons and makes clear recommendations for future orientation in addressing the key problems in the lack of progress. The PIRs shall be documented with the evidence of the achievement of end-of-project targets (as appendices). At the time of preparation of each PIR, UNEP, ADB and MoHUA/NIUA will evaluate project progress to deliver within the project timeframe of four years. If a project extension is projected to be required, MoHUA/NIUA will develop a plan to ensure effective project management during an extension period, noting the PMC budget limit as determined by the GEF. This may include saving part of the PMC budget during project execution as an extension contingency and/or co-financing project management activities during an extension period. | Execution: PIL and Task Managers  Support: PMU | 1 report to be prepared on an annual basis, to be submitted by 31 July latest | As part of CPC and PMU budget |
|---|---|---|---|---|
| Annual Inventory of Non-expendable equipment | Report with the complete and accurate records of non-expendable equipment purchased with GEF project funds | Execution: PIL  Support: PMU | 1 report per year as at 31 December, to be submitted by 20 January latest | As part of PIL and PMU budget |

| Co-financing Report | Report on co-financing (cash and/or in-kind) fulfilled contributions from all project partners that provided co-finance letters. | Execution: PIL<br><br>Support: co-finance partners | 1 annual report from each co-finance partner, and 1 consolidated report, to be submitted by 20 July latest | As part of PIL and PMU budget |
|---|---|---|---|---|
| Mid-Term Review (MTR) or mid-term evaluation | The purpose of the MTE or MTR is to provide an independent assessment of project performance at mid-term, to analyse whether the project is on track, what problems and challenges the project is encountering, and which corrective actions are required so that the project can achieve its intended outcomes by project completion in the most efficient and sustainable way. It will verify information gathered through the GEF tracking tools. | Execution: Independent Evaluator / Task Managers<br><br>Support: PIL, PMU | At mid-point of project implementation if deemed needed by the Task Managers | GEF:<br><br>US$ 50,000 |
| Final Project Workshop | Final Workshop will present the outcomes and outputs to all the key stakeholders and the donors with the view of identify the opportunities to take the project work forward. | Execution: PIL<br><br>Support: PMU | 1 report to be prepared following the IW, to be shared with participants 4 weeks after the IW (latest) | As part of PIL and PMU budget<br><br>Budget: 15,000 |

| Final Report | The project team will draft and submit a Project Final Report, with other docs (such as the evidence to document the achievement of end-of-project targets).<br><br>Comprehensive report summarizing all outputs, achievements, lessons learned, objectives met or not achieved structures and systems implemented, etc. Lays out recommendations for any further steps to be taken to ensure the sustainability and replication of project outcomes. | Execution: PIL<br><br>Support: PMU | Final report to be submitted no later than three (3) months after the technical completion date | GEF: as part of CPC budget |
| --- | --- | --- | --- | --- |
| Terminal Evaluation (TE) | Further review the topics covered in the mid-term evaluation.<br><br>Looks at the impacts and sustainability of the results, including the contribution to capacity development and the achievement of global environmental goals. | Execution: Independent Evaluator / Task Managers<br><br>Support: PIL, PMU, TM | Can be initiated within six (6) months prior to the project?s technical completion date | GEF:<br><br>US$ 75,000 |
| **TOTAL M&E COST** | | | | **US$ 160,000** |

**10. Benefits**

**Describe the socioeconomic benefits to be delivered by the project at the national and local levels, as appropriate. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)?**

*Adaptation:* The NbS restoration of Lake Kadapakkam will increase the storage capacity of the water body by 1.75 million m3. This would significantly reduce the flood risk in the project sub-basin and downstream area by serving as a water retaining structure.The work on integrated low emission resilient coastal zone plan will provide adaptation benefits through increased resilience of the Surat coastal areas. The conservation of coastal ecosystems through NbS measures will increase the green space. This will help address the heat island affect in Surat thus increasing the resilience of Surat against increased temperature due to climate change. Similarly the green NMT infrastructure will contribute to adaptation to increased temperatures increasing the green areas.

*Water Security:* The free catchment area of the lake Kadapakkam is about 3.2 km2 & the combined catchment area is about 13.4 km2. Based on prior restorations in Chennai, considering the soil

characteristics and the sub-strata conditions it can be estimated that the groundwater table will improve by about 1.2 m. This is significantly improving the water supply position for surrounding agriculture and also residential use in the catchment area which is currently dependent on sub-surface water for irrigation.

*Biodiversity:* The intervention in lake Kadapakkam will also lead to the restoration of the habitat of many species whose numbers have dwindled over the past few decades. More specifically the Near Threatened (NT) species Spot-Billed Pelican (Pelecanus philippensis).[1][3] Biodiversity: The intervention in lake Kadapakkam will also lead to the restoration of the habitat of many species whose numbers have dwindled over the past few decades. More specifically the Near Threatened (NT) species Spot-Billed Pelican (Pelecanus philippensis).[1] ]

The integration of conservation of coastal ecosystems in development plans through NbS measures will increase the green and blue ecosystems areas in city and thus result in increased biodiversity benefits.

*Environmental Benefits*: Urban air quality can substantially improve because of the implementation of low emissions mobility options and NMT infrastructure. The NBS solutions and preservation of environmental resources will help reduce the impact of both flooding and heat island effects.

The low emission green corridor development and related investment would help in converging disjoint initiatives into an integrated initiative for leveraging collective benefits.  The project will lead to enhanced sustainable management of transit corridors and will ensure its integration with the city ecosystem thus improve city?s access to the low emission facilities. Besides, it would help open new economic avenues for the city.

Through the development of an enhanced knowledge base relating to low emission green corridor development and improved information on linkages with, and contributions to key economic sectors, the project will facilitate improved decision-making to minimize adverse impacts on the local community. The low emission green corridor project will be integrated with the city ecosystem through deployment of sustainable solutions like development of safe access, NMT infrastructure, Net zero energy building, green urban spaces and facilitating EV usage supported by charging infrastructure.

*Economic benefits:* citizens will experience health benefits from reduced air pollution and reduced heat island effects. This will have a positive impact on the productivity of an individual and therefore the city. New technologies that will be identified as part of the project ? NMT infra, NBS solutions, energy efficiency materials etc. will provide new business opportunities. The vulnerable assessment and hazard risk assessment for infrastructure projects will enable the city authorities to assess the economic impact of the hazards and help prepare the authorities for the eventual outcomes. The authorities will also be able to save scarce public resources due to incorporation of resilience strategies into project designs.

Collaborative planning: the integrated approach proposed  by the project, in component 1, will provide a more collaborative planning practice to involve and all the stakeholders during the planning and design stages of projects leads to an inclusive decision-making process which in turn can bring social benefits as well as sustainability benefits to the citizens. The inclusive process to involve the project affected people and the local citizens in the planning process will enable the city authorities to meet the project outcomes in an informed manner. The development of NMT infrastructure, green corridors within the pilot area will

enhance the attractiveness of the project area and hence provide opportunities to create new jobs in various economic activities.

*Gender specific:* The project will place emphasis on gender-sensitive training and capacity-building, increasing women?s access to finance, strengthening participation in governance processes, and targeting women as influencers in behavior change communications. for ensuring gender mainstreaming agenda is integrated within low emission green corridor development, there will be specific emphasis on gender responsive components such as lighting, direct, at-grade connections, wide and safe sidewalks, and crosswalks, etc. This project will ensure that gender considerations are incorporated into both project design and execution. There would be a specific focus to capture and disseminate the gender-related actions and learnings from the projects to other stakeholders through a dedicated capacity building module which will be developed and included in all programmes.

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[1] As identified in the Biodiversity Assessment

## 11. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

**Overall Project/Program Risk Classification**\*

| PIF | CEO Endorsement/Approval | MTR | TE |
|---|---|---|---|
| | Medium/Moderate | | |

**Measures to address identified risks and impacts**

Elaborate on the types and risk classifications/ratings of any identified environmental and social risks and impacts (considering the GEF ESS Minimum Standards) and any measures undertaken as well as planned management measures to address these risks during implementation.

1. Take Good Practice approach 2. Carry out further assessments (e.g., site visits, experts? inputs, consult affected communities, etc.). 3. Labor and working conditions, biodiversity, and climate change

risks would require management plans. Gender and stakeholder engagement plans would also need to be prepared at the early stage of the project implementation.

**Supporting Documents**

Upload available ESS supporting documents.

| Title | Module | Submitted |
|-------|--------|-----------|
| **SRIF GEF ID 10484 India SCIP** | **CEO Endorsement ESS** | |

**ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).**

| Project Objective | Objective level Indicators | Baseline | Mid-term target | End of project target | Means of Verification | Assumptions (for information on the risks, see section 5 of the CEO document) |
|---|---|---|---|---|---|---|
| To demonstrate low emissions, resilient, nature-based inclusive sustainable urban development in selected cities and support scale-up nationally | A: Tons of CO2e reduced until the end of the project | 0 | | 35, 917,405 million tCO2e | Governmental monitoring records, including through monitoring undertaken as part of component 2 deliverables. | Local government support ensures all project pilots are fully executed<br><br>Expectations on modal change induced by the project are accomplished (see detailed assumptions in Annex M) |
| | B: Total land area under improved management: | 0 | | 1992.2 Hectares | Governmental records | Political will to implement plans |
| | C: Number of beneficiaries | 0 | | 12,208,398 (women: 5,813,016) | Governmental monitoring records, including through the project. | Local government support (see risk #1) ensures all project pilots are fully executed (component 2). |

| | | | | | |
|---|---|---|---|---|---|
| | D: # of cities implementing innovative policy and financing schemes for integrated urban planning. | 0 | | 5 | Project Monitoring Reports | |
| **Outcomes** | **Indicators for outcomes** | | | | | |
| 1. Key stakeholders in target Cities adopt evidence-based sustainable and integrated city development planning approaches | 1: # of target cities adopt and integrate the Coordination Guidelines and guidelines for integrated planning in selected intervention areas to address key urban issues into their Planning processes | 0 | Guidelines and Protocols drafted: | 3 | Final Project Report and TE report: The guidelines adopted covers the following deliverables Chennai: 1.1.1b, & 1.1.2, a,b,c,d Pune: 1.2.1b &1.2.2a,b,c; Surat: 1.3.1b & 1.3.2 a,b,c | Local governments support the adoption of the approaches and guidelines in the decision and planning processes. Central and Local governments continue to prioritize data based governance for cities. |
| | 2: # of target cities operationalize improved digitalization and data infrastructure (including sex-disaggregated data) for planning and monitoring sustainable development | 0 | Design of additional digital layers and required data for all three 3 cities ready | 3 | Final Project Report and TE report | Support of key city government influencers in ensuring effective cooperation and coordination with the project implementation |
| | 3: # of planning officials trained in new skills and knowledge for integrated planning in selected urban areas. | 0 | | 60 (disaggregated by sex) | Final Project Report and TE report Workshops reports | |

| 2. Key stakeholders in target cities apply tools, knowledge and experiences to develop sustainable investment projects for low-emission resilient Urban development | 1. $ amount of investment plans implemented by Cities for integrated low emission resilience development (Co-finance # ) | 0 | | 474 million USD | Co-finance report of last year of implementation<br><br>List the city co-finance | The local government has the political intention of implementing financial mechanisms and business models |
|---|---|---|---|---|---|---|
| | 2. # of investments for implementing integrated low emission resilient development plan finalized | 0 | | 2 | Final Project Report and TE report<br><br>List of plans in the cities<br><br>?    TPS 80 and 81 plan for Surat with identified investment for social, environmental and transport<br><br>?    Station TOD plan with investment opportunities developed for Pune | The local government authority see value in participation of Private sector in PPP models. |
| | 3. USD Leveraged finance from Private sector for investment and operation of pilots | 0 | | 10 million USD | Letters of commitments received from Private sector for participation | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3. Target cities increasingly adopt innovative financing solutions and business models to scale up green urban solutions | 1: # of Cities having access to new innovative financing mechanism/schemes | 0 | Most of the deliverables will be finalized in year 3. | 3 | Final Project Report and TE report<br><br>?      Urban Transport Fund for Pune<br><br>?      Inventive Scheme for Flood Management for Chennai<br><br>?      Raising financing from ecosystems for Surat | The local government has the political will and intention of implementing financial mechanisms and business models |
| | 2: # of Financing plans developed and financing facilitated | 0 | Financing opportunities identified in Agra and Puducherry | 4 | ? Investment for low emissions resilience investment in Agra and Puducherry facilitated<br><br>?      3 investment opportunities identified and facilitated in Surat for green infrastructure | |
| | 2: # of investment ready projects/funds for scaling up sustainable investment | 0 | | 5 | Final Project Report and TE report<br><br>? Investment proposals for Agra, Puducherry and Surat (list of investment projects) | |

| 4. Increasing number of Indian City authorities and stakeholders use the knowledge, tools, best practice examples, made available on National Urban Learning Platform (NULP), hosted by NIUA, and linked to UrbanShift, to develop and implement integrated sustainable development plans and investments | 1: # of training modules based on guidelines, tools, best practices developed and shared through the National Platform and UrbanShift | 0 | | 10 | Statistics from the Project website<br><br>? These are guidelines, tools, best practices and case studies prepared from Component 1,2, & 3.<br><br>? 10 guidelines<br><br>? 3 pilot case studies<br><br>? 5 finance related products | Central Government continues to support the NIUA efforts in providing the knowledge and support for cities to adopt integrated urban planning approaches and investments.<br><br>State level training institutes have the capacity and resources to integrate training programmes into its programmes. |
|---|---|---|---|---|---|---|
| | 2: # of State level Training institutes that have rolled out training the trainer package developed in the project. | 0 | | 6 | Deliverable 4.2.3 ? each target city state delivers training to 2 other states | |
| | 3: # urban practitioners that used the knowledge acquired from the training or materials from the National and UrbanShift (sex disaggregated) | 0 | | 100 (40% women) | Survey report undertaken at the end of the project.<br><br>? Cities other than the target cities<br><br>? Other Cities in the same state | Continued support of central and state government to city authorities in facilitating investments in sustainable integrated urban planning. |

**ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).**

Please see Annex B of the attached CEO - ER Document.

## ANNEX C: Status of Utilization of Project Preparation Grant (PPG).
## (Provide detailed funding amount of the PPG activities financing status in the table below:

| PPG Grant Approved at PIF: **US$ 165,138 (UNEP)** | | | |
|---|---|---|---|
| *Project Preparation Activities Implemented* | *GETF/LDCF/SCCF Amount (US$)* | | |
| | *Budgeted Amount* | *Amount Spent to date* | *Amount Committed* |
| **Urban Development Experts (Staff)** | 104,496 | 124,428 | |
| **Consultants** | 32,067 | 21,222 | |
| **Operating and other costs** | 17,781 | 9,030 | 2,179 |
| **Supplies, commodities & Material** | 10,794 | 8,280 | |
| **Total** | **165,138** | 162,959* | |

**\*:** Please this is the expenditure incurred as reported by entity hired to support the PPG phase. The final expenditure statement is still under approval and may be subject to some changes.

**ADB didn?t request the use of 110,092 USD PPG and hence were not used.** ADB used the following resources in the PPG Phase: i) used the resources of its ADB/GEF coordination team full time Senior Environment Specialist, ii) used resources from its loan project preparation technical assistance to engage a team of specialists which included a lead ADB/GEF urban development specialist, biodiversity, safeguards, gender and others specialists.

## ANNEX D: Project Map(s) and Coordinates

## Please attach the geographical location of the project area, if possible.

City Coordinates are presented below. The Maps of Primary Target Cities is included in Main body. Annex includes Maps of replication cities.

| City | Coordinates |
|---|---|
| Chennai | Latitude 13.2031N; Longitude 80.2529E |

| Pune | Latitude: 18.5204 N; Longitude: 73.8567 E |
| --- | --- |
| Surat | Latitude: 21.1702 N; Longitude: 72.8311E |
| Agra | Latitude: 27.1767? N, Longitude: 78.0081? E |
| Madurai | Latitude: 9.9252? N, Longitude: 78.1198? E |
| Puducherry | Latitude: 11.9416? N, Longitude: 79.8083? E |

(i) Map of Agra
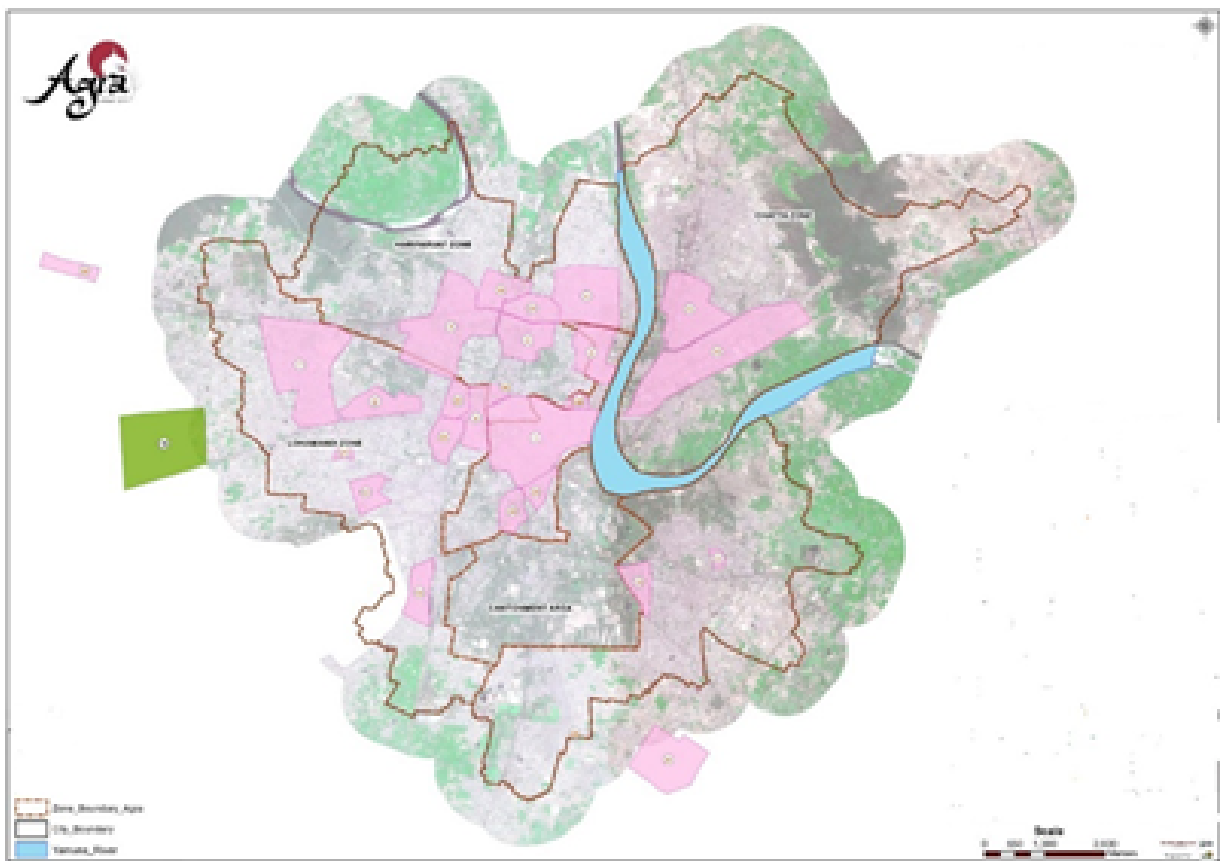


(ii) Map of Madurai

(iii) Map of Puducherry

## Puducherry District Map



**ANNEX E: Project Budget Table**

**Please attach a project budget table.**

| Expenditure Category | Detailed Description | Component (USDeq.) | | | | | | | Total (USD eq.) | Responsible Entity |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Comp 1 Total | Comp 2 Total | Comp 3 Total | Comp 4 Total | Comp Sub-Total | M&E | PMC | | |

| Type | Description | | | | | | | | | Agency |
|---|---|---|---|---|---|---|---|---|---|---|
| Works | Demonstration Nature-based Investment in Kadapakkam lake | 0.00 | 5357.19 | 0.00 | 0.00 | 5357.19 | | | 5357.19 | Greater Chennai Corporation |
| | Pilot demonstration of green NMT and EV Charging infrastructure based on Station TOD Area Plan | 0.00 | 1300.00 | 0.00 | 0.00 | 1300.00 | | | 1300.00 | PSCDCL/NIUA |
| Goods | Equipment: (Includes Laptops, Software, Furniture, Insurance & Annual maintenance contract (AMC) for equipment?s, Tech Supplies, Safety Equipment etc.) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 33.65 | 33.65 | NIUA (15.00)/GCC(18.65) |
| Contractual Services ? Company | Preparation of Green Infrastructure Manual | 60.00 | 0.00 | 0.00 | 0.00 | 60.00 | | | 60.00 | GCC |
| | Specialist Services related to Civil Work | 0.00 | 66.00 | 0.00 | 0.00 | 66.00 | | | 66.00 | GCC |
| | Site Surveys for Biodiversity Assessment | 0.00 | 25.00 | 0.00 | 0.00 | 25.00 | | | 25.00 | GCC |
| | Investment Readiness Roadmap- Replication City | 0.00 | 0.00 | 730.00 | 0.00 | 730.00 | | | 730.00 | GCC |
| | Coordination Lessons learned and documented | 20.00 | 0.00 | 0.00 | 0.00 | 20.00 | | | | |
| | Guideline for designing Low-emission Resilient Green transit corridor | 100.00 | 0.00 | 0.00 | 0.00 | 100.00 | | | 100.00 | PSCDCL/NIUA |
| | Planning Guideline for TOD Station Area | 75.00 | 20.00 | 0.00 | 0.00 | 95.00 | | | 95.00 | PSCDCL/NIUA |
| | EV Ready Guidelines | 75.00 | 0.00 | 0.00 | 0.00 | 75.00 | | | 75.00 | PSCDCL/NIUA |

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|---|---|---|---|---|---|---|---|---|---|---|
| | Digital platform including data collection (For Pune and Surat) | 600.00 | 0.00 | 0.00 | 0.00 | 600.00 | | | 600.00 | PSCDCL/SMC/NIUA |
| | Low emission resilient plant for Dumas and surround areas | 275.00 | 0.00 | 0.00 | 0.00 | 275.00 | | | 275.00 | SMC/NIUA |
| | Guidelines for deliverable 1.3.2 | 25.00 | 25.00 | 0.00 | 0.00 | 50.00 | | | 50.00 | SMC/NIUA |
| | Low-emission resilient green Station TOD Area Plan including carrying capacity analysis (Del 2.21 and 2.2.2) | 0.00 | 360.00 | 0.00 | 0.00 | 360.00 | | | 360.00 | PSCDCL/NIUA |
| | Integrated Low-emission resilient Plan developed for Town Planning Schemes (TPS) no 80 and 81 | 0.00 | 450.00 | 0.00 | 0.00 | 450.00 | | | 450.00 | SMC/NIUA |
| | Design of Pilots to showcase use of NbS: | 0.00 | 1700.00 | 0.00 | 0.00 | 1700.00 | | | 1700.00 | SMC/NIUA |
| | Baseline city finance assessment (Del 3.21), literature review of international best practices on TOD (Del 3.2.2) and Linkages with light house cities | 0.00 | 0.00 | 100.00 | 0.00 | 100.00 | | | 100.00 | PSCDCL/NIUA |
| | Design of Urban Transport Fund | 0.00 | 0.00 | 380.00 | 0.00 | 380.00 | | | 380.00 | PSCDCL/NIUA |
| | Feasibility assessment of business models to establish green corridors and PPP initiatives | 0.00 | 0.00 | 200.00 | 0.00 | 200.00 | | | 200.00 | PSCDCL/NIUA |
| | PPP funding model, including pre-feasibility assessment, for NMT infrastructure creation and PBS in Dumas Pilot Project Area | 0.00 | 0.00 | 400.00 | 0.00 | 400.00 | | | 400.00 | SMC/NIUA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Coordinated and cooperative investment planning mechanism for NBS among various departments to pool investment budgets established* | *0.00* | *0.00* | *40.00* | *0.00* | *40.00* | | | *40.00* | *SMC/NIUA* |
| | *Feasibility of capturing value created by ecosystem service for coastal protection, and ringfencing variou s land-based revenues to protect and develop coastal zones using NbS* | *0.00* | *0.00* | *190.0 0* | *0.00* | *190.0 0* | | | *190.0 0* | *SMC/NIUA* |
| | *A portfolio of ?investment ready? green infrastructure proj ects developed and presented to wide range of donors* | *0.00* | *0.00* | *50.00* | *0.00* | *50.00* | | | *50.00* | *SMC/NIUA* |
| | *Establishing National Project Website* | *0.00* | *0.00* | *0.00* | *100.0 0* | *100.0 0* | | | *100.0 0* | *NIUA* |
| | *National Cities communication campaign* | *0.00* | *0.00* | *0.00* | *50.00* | *50.00* | | | *50.00* | *NIUA* |
| | *Framework for integrating Climate Change consideration in Urban Development Planning* | | | | *300.0 0* | *300.0 0* | | | *300.0 0* | |
| *Local Consult ants* | *Nature Based Solutions Specialist* | *0.00* | *16.00* | *0.00* | *0.00* | *16.00* | | | *16.00* | *GCC* |
| | *Knowledge & Learning Specialist* | *0.00* | *0.00* | *0.00* | *67.20* | *67.20* | | | *67.20* | *GCC* |
| | *Subject Matter Experts - Need/Subject Based* | *0.00* | *19.20* | *0.00* | *0.00* | *19.20* | | | *19.20* | *GCC* |

| Category | Item | | | | | | | | | Source |
|---|---|---|---|---|---|---|---|---|---|---|
| | Subject Matter Experts (Need Based) (Replication City) | 0.00 | 0.00 | 160.00 | 0.00 | 160.00 | | | 160.00 | GCC |
| | Gender Expert | 0.00 | 0.00 | 0.00 | 84.00 | 84.00 | | | 84.00 | NIUA |
| | Subject Matter Experts (Need Based) Pune & Surat | 0.00 | 211.97 | 0.00 | 0.00 | 211.97 | | | | PSCDCL/SMC/NIUA |
| | Monitoring & Evaluation Specialist (MTR) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 40.00 | | 40.00 | ADB & UNEP |
| | Audits | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 25.00 | | NIUA |
| International Consultant | Monitoring and Evaluation Specialist (TE) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 85.00 | | 85.00 | ADB & UNEP |
| Salary and benefits / Staff costs | ADB/GEF Chennai Project Coordinator | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 168.00 | 168.00 | GCC |
| | Urban Development Expert (Project Implementation Lead) | 192.00 | 0.00 | 0.00 | 0.00 | 192.00 | | 0.00 | 192.00 | NIUA |
| | City Urban Experts (Pune and Surat) | 88.00 | 100.00 | 100.00 | 0.00 | 288.00 | | | 288.00 | PSCDCL/SMC/NIUA |
| | Urban Finance Specialist | 0.00 | 0.00 | 126.00 | 0.00 | 126.00 | | | 126.00 | NIUA |
| | Urban Transport Expert | 0.00 | 105.00 | 0.00 | 0.00 | 105.00 | | | 105.00 | NIUA |
| | Data Experts (Pune and Suratl) | 96.00 | 48.00 | 48.00 | 0.00 | 192.00 | | | 192.00 | PSCDCL/SMC/NIUA |
| | Knowledge and Communication expert | 0.00 | 0.00 | 0.00 | 115.07 | 115.07 | | | 115.07 | NIUA |
| | Ass Project Manager | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 96.00 | 96.00 | NIUA |
| | Asmin Assistant | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 39.45 | 39.45 | NIUA |
| | Finance Assistant/Finance Admin Assistant /HR Assistant/(NIUA/Pune/Surat) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 191.85 | 191.85 | NIUA |
| | Procurement Officer (part time) | | | | | | | 25.00 | | |

| Category | Item | | | | | | | | | Responsible |
|---|---|---|---|---|---|---|---|---|---|---|
| Trainings, Workshops, Meetings | 5 Workshops related to Green Infrastruture Manual | 10.00 | 0.00 | 0.00 | 0.00 | 10.00 | | | 10.00 | GCC |
| | City Capacity Building workshops (Pune and Surat) | 70.00 | 70.00 | 70.00 | 0.00 | 210.00 | | | 210.00 | PSCDCL/SMC/NIUA |
| | Training of Trainer workshops (Del 4.1.4) | 0.00 | 0.00 | 0.00 | 70.00 | 70.00 | | | 70.00 | NIUA |
| | National Dialogues (led by Pune and Surat) | 0.00 | 0.00 | 0.00 | 75.00 | 75.00 | | | 75.00 | PSCDCL/SMC/NIUA |
| | State level training workshops (Pune and Surat) | 0.00 | 0.00 | 0.00 | 70.00 | 70.00 | | | 70.00 | PSCDCL/SMC/NIUA |
| | UrbanShift City Lab | 22.36 | 0.00 | 0.00 | 0.00 | 22.36 | | | 22.36 | |
| | Meeting/ Discussion Expenses for project management and coordination: (Includes Meeting/ Discussion room hiring, electricity, driking water, refreshment & food, internet expenses) | | | | | | | 84.70 | 84.70 | NIUA (48)/GCC(36.7) |
| | Community & National Webinars for Capacity Building & Knowledge Sharing | 0.00 | 0.00 | 0.00 | 19.50 | 19.50 | | | 19.50 | GCC |
| | Inception and Project ending workshop | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 35.00 | | 35.00 | |
| Travel | Local Travel for Project Specialists & Consultants | 0.00 | 4.00 | 0.00 | 0.00 | 4.00 | | | 4.00 | GCC |
| | GCC Participation in UrbanShift (GEF SCIP Platform) National & Global | 0.00 | 0.00 | 0.00 | 187.28 | 187.28 | | | 187.28 | GCC |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Replication City Participation in UrbanShift (GEF SCIP Platform) - \National & Global | 0.00 | 0.00 | 0.00 | 50.16 | 50.16 | | | 50.16 | GCC |
| | Travel for City level events (Pune and Surat) | 10.00 | 10.00 | 10.00 | 0.00 | 30.00 | | | 30.00 | PSCDCL/SMC/NIUA |
| | Travel for Participants to NIUA TOT workshops | 0.00 | 0.00 | 0.00 | 50.00 | 50.00 | | | 50.00 | NIUA |
| | Travel for National and International Events (NIUA) | 0.00 | 0.00 | 0.00 | 50.00 | 50.00 | | | 50.00 | NIUA |
| | Travel for National Dialogues | 0.00 | 0.00 | 0.00 | 75.00 | 75.00 | | | 75.00 | PSCDCL/SMC/NIUA |
| | Travel for State Level Training workshops | 0.00 | 0.00 | 0.00 | 20.00 | 20.00 | | | 20.00 | PSCDCL/SMC/NIUA |
| | Pune and Surat Participation in UrbanShift events | 0.00 | 0.00 | 0.00 | 400.00 | 400.00 | | | 400.00 | PSCDCL/SMC/NIUA |
| | Travel for Project Management Unit (UNEP) | 0.00 | 0.00 | 0.00 | 63.38 | 63.38 | | 76.14 | 139.52 | NIUA |
| | Travel of Chennai PM team (ADB) | | | | | | | 48.00 | | GCC |
| Office Supplies / Printing | Creation / Production of Reports | 0.00 | 6.00 | 10.00 | 163.55 | 179.55 | | | 179.55 | GCC |
| Other Operating Costs | Communication and Miscellenous | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 32.00 | 32.00 | NIUA (15.15)/GCC (16.85) |
| **Grand Total** | | 1718.360 | 9893.360 | 2614.000 | 2010.140 | 16235.860 | 160.000 | 819.792 | 17215.652 | |

**ANNEX F: (For NGI only) Termsheet**

Instructions. Please submit an finalized termsheet in this section. The NGI Program Call for Proposals provided a template in Annex A of the Call for Proposals that can be used by the Agency. Agencies can use their own termsheets but must add sections on Currency Risk, Co-financing Ratio and Financial Additionality as defined in the template provided in Annex A of the Call for proposals. Termsheets submitted at CEO endorsement stage should include final terms and conditions of the financing.

**ANNEX G: (For NGI only) Reflows**

<u>Instructions</u>. Please submit a reflows table as provided in Annex B of the NGI Program Call for Proposals and the Trustee excel sheet for reflows (as provided by the Secretariat or the Trustee) in the Document Section of the CEO endorsement. The Agencys is required to quantify any expected financial return/gains/interests earned on non-grant instruments that will be transferred to the GEF Trust Fund as noted in the Guidelines on the Project and Program Cycle Policy. Partner Agencies will be required to comply with the reflows procedures established in their respective Financial Procedures Agreement with the GEF Trustee. Agencies are welcomed to provide assumptions that explain expected financial reflow schedules.

**ANNEX H: (For NGI only) Agency Capacity to generate reflows**

<u>Instructions</u>. The GEF Agency submitting the CEO endorsement request is required to respond to any questions raised as part of the PIF review process that required clarifications on the Agency Capacity to manage reflows. This Annex seeks to demonstrate Agencies? capacity and eligibility to administer NGI resources as established in the Guidelines on the Project and Program Cycle Policy, GEF/C.52/Inf.06/Rev.01, June 9, 2017 (Annex 5).